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Ichneumon-Flies of America North of Mexico: 3. Subfamily Gelinae, Tribe Mesostenini

By HENRY and MARJORIE TOWNES

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Ichneumon-Flies of America North of Mexico

Henry and Marjorie Townes

Introduction

This is part 3 of a series of monographs on the ichneumon flies of America north of Mexico, prepared under a project supported by the Dow Chemical Company, The University of Michigan, and the National Science Foundation. The first part, on the Metopiinae, was issued March 6, 1959, as U.S. National Museum Bulletin 216, part 1. The second part, on the Ephialtinae, Xoridinae, and Acaenitinae, was issued June 24, 1960, as part 2 of that Bulletin.

The statements in parts 1 and 2 about bibliography, terminology, and material studied apply also to this paper. References to original descriptions concerning Nearctic specimens are all given, and references to original descriptions based on exotic specimens are given where they seem necessary to explain the nomenclature. Papers on biology and morphology are cited, but those which record only hosts or localities, or which are secondary taxonomic references, are omitted. If these are of interest, however, they can be located in a recent catalog (Townes, 1945, Mem. Amer. Ent. Soc., No. 11, pp. 249–297).

Terminology of taxonomic structures is explained in part 1 (pp. vii–ix) of this bulletin. This corresponds in the main with the terminology given by Smith and Shenefelt (1956, Trans. Wisconsin Acad. Sci., Arts, Lett., vol. 44, pp. 168, 200–219). Terminology of the ovipositor tip is explained in part 2 (fig. 329,i) of this bulletin.

The locality and host records we cite are only from specimens seen by ourselves, except in the case of *Acroricnus stylator*, where records from Mitchell's recent revision are added to the maps. All other unconfirmed reports are omitted. In most cases, however, we have restudied the specimens on which published records are based. If a published locality or host record is not repeated among our data, it has not been confirmed. For names of the hosts, we have had to accept the statements on the pin labels, which in some cases are probably incorrect. We take responsibility for determinations of the parasites, but not of the hosts. The nomenclature of the hosts has been modified from that on the pin labels to conform with current usage.

In discussing seasonal distributions of species, we have usually disregarded the dates on pin labels of reared specimens because many of these emerged in an indoor climate, out of their natural seasons.

Wherever possible, types have been seen to make sure that the zoological application of names is correct.[1] All types of Nearctic origin have been studied (so far as they still exist) except for those of *Cryptus crassisculptus* Pratt, *C. rugosiscutum* Pratt, *C. strigosus* Pratt and *Spilocryptus cecropiae* Habermehl. Types of genotypes that concern Nearctic genera have been seen except in the cases of the genotypes of *Acroricnus*, *Agathobanchus*, *Brachycentrus*, *Chyronomon*, *Compsocryptus*, *Cryptanura*, *Echthrus*, *Gambrus*, *Goniocryptus*, *Leptobatides*, *Meringopus*, *Neochristolia*, *Neocryptopteryx*, *Nyxeophilus*, *Protocryptus*, *Sphaetes*, *Sphecophaga*, *Spilocryptus*, *Trychosis*, and *Xenocodon*. Though the types of these genotypes are either destroyed or were not available to us, it has been possible to study specimens of the type species in all cases except those of *Cryptanura*, *Gambrus*, *Neochristolia*, *Neocryptopteryx*, and *Protocryptus*.

Acknowledgments

The basic financial support for this research is from the Dow Chemical Company. The University of Michigan provides working facilities, and grants from the National Science Foundation meet the costs of clerical help, illustrations, supplies, and travel. At the Dow Chemical Company, Mr. R. R. Dreisbach envisioned and encouraged support for this work. Prof. T. H. Hubbell at the University of Michigan welcomed us in his laboratories and provided congenial and efficient working conditions.

Use has been made of most of the larger collections of ichneumonids in North America. We are grateful to the many collectors who have assembled the material, to the institutions that have preserved it, and to the curators who have sent it on loan. A number of friends have contributed to our personal collection valuable lots of specimens, both from this country and abroad. These lots have been especially helpful.

The most active collector besides ourselves has been Mr. R. R. Dreisbach. Most of his work has been in Michigan, and the thorough record of the ichneumonid fauna of this state is the result mostly of

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[1] In 1960, while studying types of Mesostenini in Quebec, we had an opportunity to reexamine the three types about which uncertainty was expressed in the recently published part 2 of this Bulletin. These are the types of *Epirhyssa crevieri* Provancher, *Polysphincta bruneti* Provancher, and *Coleocentrus quebecensis* Provancher. All three, fortunately, were correctly interpreted in part 2.

his efforts. Some of his other collecting work in Mexico provided a valuable set of specimens which were used in relating the species described from Mexico and Central America to those in the southern United States.

Another strategic lot of material was from Mr. Gerd Heinrich of Dryden, Maine, consisting of a beautifully prepared set of specimens from Central Europe. A large portion of the genotype illustrations was made from these, and the collection in general has been useful for comparisons between the Nearctic and European faunas. A set of named specimens received in exchange from Prof. Toichi Uchida has been useful in dealing with the species of the eastern Palearctic.

Collections included in the study are listed below. In the distributional data these are referred to by the names of their cities for institutional collections, or by the names of their owners for personal collections.

American Museum of Natural History, New York, New York
California Academy of Sciences, San Francisco, California
Canadian National Collection, Ottawa, Ontario
Carnegie Museum, Pittsburgh, Pennsylvania
Dreisbach Collection, Midland, Michigan
Harvard University, Cambridge, Massachusetts
Michigan State University, East Lansing, Michigan
Mitchell Collection, Riverdale, Maryland
North Carolina Department of Agriculture, Raleigh, North Carolina
Ohio State University, Columbus, Ohio
Oregon State College, Corvallis, Oregon
Townes Collection, Ann Arbor, Michigan
United States National Museum, Washington, District of Columbia
University of California, Berkeley, California
University of California at Davis, Davis, California
University of Idaho, Moscow, Idaho
University of Kansas, Lawrence, Kansas
University of Michigan, Ann Arbor, Michigan
University of Minnesota, St. Paul, Minnesota
University of Wisconsin, Madison, Wisconsin

Several colleagues have given assistance beyond the customary loan of specimens. These are: Dr. Hugh B. Leech of the California Academy of Sciences, Dr. Edwin F. Cook of the University of Minnesota, Miss Luella Walkley of the United States Department of Agriculture, Mr. G. Stuart Walley and Dr. W. R. M. Mason of the Canadian National Collection, and Mr. J. F. Perkins of the Natural History Museum in London. Prof. Jan Noskiewicz and Dr. J. Aubert have compared specimens for us with the types of *Cryptus calescens* Gravenhorst and *Cryptus fuscipennis* Brullé, respectively.

The drawings are by Miss Y. Morimoto, executed under the supervision of Prof. M. Tokunaga of Kyoto Prefectural University. Photomicrographs are by Mr. Louis Martony and Mr. Karl Kalmbach of the University of Michigan Photographic Services. Miss Ellen Linna typed the manuscript and was a reliable assistant in the very large task of assembling the distributional data and making the maps.

Those parts of the paper that validate new generic, specific, and subspecific names are the work of the senior author alone. Author citation for them will therefore be "Townes" rather than "Townes and Townes." Though there has been specialization between the joint authors, the paper is the result of 25 years of joint effort, each contributing according to aptitude and available time.

3. Subfamily Gelinae: Tribe Mesostenini

Subfamily Gelinae

The Mesostenini, subject of this revision, is one of three tribes of the subfamily Gelinae. Since the limits of the Mesostenini need definition, we give below a characterization of the subfamily, then a key to and descriptions of its tribes:

Clypeus separated from face by a groove; male flagellum usually with tyloids; areolet with the intercubiti nearly always separate on the radial vein, nearly always pentagonal or quadrangular, sometimes open apically but the pentagonal or quadrangular shape usually still indicated; wings sometimes vestigial or absent; apex of front tibia rounded on outer side, without a small angle or tooth; sternaulus usually sharp and longer than half the length of mesopleurum; tarsal claws apparently simple; first abdominal tergite fused with its sternite, without a lateral pit or groove in front of its spiracle, more or less decurved at the spiracle and broadened beyond, the spiracle usually beyond the middle but sometimes at or just in front of the middle; abdomen nearly always depressed, its third segment being wider than deep (compressed in females of *Tropistes* and of *Atractodes*); ovipositor usually extending beyond apex of abdomen, its dorsal valve without a preapical notch, or if a preapical notch is present this is on a subapical elevation and the lower valve has an apical series of teeth.

This is a distinct subfamily, but as indicated above most of its characters are subject to some exceptions. The pentagonal or quadrangular areolet, long sharp sternaulus, depressed abdomen, ovipositor surpassing apex of abdomen, spiracles of first abdominal segment beyond the middle, and tergite of first abdominal segment fused with its sternite make a combination of characters that permit reliable recognition, but all except the last of these characters is subject to exceptions. Probably the beginner will have most difficulty separating the Gelinae from the Ichneumoninae, which like the Gelinae have a pentagonal or sometimes quadrangular areolet, and further similarities in the first abdominal segment and general shape of the body. The Ichneumoninae differ from the Gelinae most conspicuously in having a shorter weaker sternaulus, ovipositor not surpassing apex of abdomen, and larger, flatter, and more truncate clypeus. Here, again, there are exceptions to the differences, and experience or comparison material will sometimes be necessary. No practical characterization to cover all cases seems possible. The Ichneumoninae and Gelinae, though sometimes hard for beginners to separate as adults, have larvae which are sharply different, and thus it seems that the similarity of the adults is due to convergence rather than to a close relationship.

Key to the tribes of Gelinae

1. Wings fully developed, the front wing longer than the thorax 2
   Wings absent or vestigial, the front wing shorter than the thorax . . . 4
2. Second recurrent vein with two bullae or rarely with one, nearly always sloping outward posteriorly so that posterodistal corner of second discoidal cell is somewhat longer and more pointed than anterodistal corner; face of male rarely marked with white or yellow; propodeum usually areolated, with longitudinal as well as transverse carinae . . . . **1. Gelini** (p. 4)
   Second recurrent vein with a single bulla, usually not sloping outward posteriorly and usually meeting subdiscoidal vein at a right angle; face of male frequently marked with white or yellow 3
3. Dorsal rim of metanotum with a posterior sublateral projection opposing front end of lateral longitudinal propodeal carina; propodeum with longitudinal carinae (at least the basal part of the lateral longitudinal carina present) as well as transverse carinae, or in some females only transverse carinae are present but in these the basal transverse carina is weak or absent and the apical transverse carina strong. . . . . **2. Hemigasterini** (p. 6)
   Dorsal rim of metanotum without a posterior sublateral projection (though sometimes there is such a projection just below the dorsal rim); propodeum without longitudinal carinae except for often those bordering the median basal area and rarely others; if only one transverse propodeal carina is present it is the basal carina rather than the apical one (except in *Echthrus* and a few other cases) . . . . **3. Mesostenini** (p. 7)
4. Wings entirely absent . . . . **1. Gelini** (in part) (p. 4)
   Wings present as stubs 5
5. Lateral longitudinal carina of propodeum absent basad of propodeal spiracle; fourth tarsal segment, as seen from below, sometimes deeply bilobed.
   3. Mesostenini (in part) (p. 7)
   (some specimens of *Sphecophaga* and some females of *Agrothereutes*)
   Lateral longitudinal carina of propodeum present basad of propodeal spiracle; fourth tarsal segment not at all or only weakly bilobed 6
6. Propodeum with basal transverse carina . . . . . **1. Gelini** (in part) (p. 4)
   Propodeum without basal transverse carina **2. Hemigasterini** (in part) (p. 6)
   (some females of *Aptesis* and of *Opidnus*)

1. Tribe Gelini

Front wing normally 2 to 9 mm. long (wings sometimes vestigal or absent); apex of clypeus various, frequently with a median pair of small teeth; head of male usually entirely black; areolet complete, open, or sometimes not formed; second recurrent vein nearly always sloping outward posteriorly so that outer hind corner of second discodial cell is somewhat longer and more pointed than is outer front corner; second recurrent vein usually with two bullae, but occasionally with one; dorsal rim of metanotum usually with a small sublateral projection opposite sublateral longitudinal carina of propodeum; propodeum usually areolated, but sometimes with only transverse carinae or in some species of *Gelis* (usually wingless species) without carinae.

This is the tribe Hemitelini of authors, plus the Gelini (=Pezomachini), Phygadeuonini, and Stilpnini, and minus the new tribe Hemigasterini. The Gelini has traditionally been a small tribe containing wingless species. It is based on *Gelis*, which is commonly wingless at least in the female, but recent study has shown that species with wings in both sexes should also be referred to *Gelis*. Though the absence of wings is a convenient character, it cannot in this case be used to separate a natural tribe, or even a genus, so the Gelini and the Hemitelini (formerly distinguished from the Gelini as having wings in both sexes) must be combined.

The absence of the areolet, traditionally the major tribal character of the Hemitelini, is an artificial distinction. Genera or species that are obviously closely related differ in the presence and absence of the areolet. Moreover, the second intercubital vein may be present as a definite vein or in various degrees of vestigial development, making it often difficult to decide whether or not it should be considered as present. Disregarding the areolet character as both artificial and unreliable, there is no usable dividing line betwen the Hemitelini of authors and the Phygadeuonini, so the Phygadeuonini also must be merged with the combined Hemitelini and Gelini.

The Stilpnini, except for the somewhat intermediate genus *Caenomeris*, may be distinguished as a unit by means of the propodeal character that is commonly used (fusion of areola with median apical area), but in other structures and in host relations the group is very close to the genus *Phygadeuon*, and it seems best to include the Stilpnini also in the broadened Gelini.

Uniting the former tribes Gelini, Hemitelini, Phygadeuonini, and Stilpnini, as suggested above, is only part of the modification needed for the development of a more natural classification. There is a distinct group of genera, included formerly in the "Phygadeuonini," which have the second recurrent vein vertical and with a single bulla. These seem nearer to the Mesostenini than to the Gelini, and since they form a rather compact unit, with many features in common, they are made to constitute the separate tribe Hemigasterini, as characterized in the key and the discussion below.

The Gelini as defined here contains a diverse set of genera which should have some grouping along natural lines of relationships. Our work toward this objective, however, is still too incomplete to publish.

2. Tribe Hemigasterini

Front wing normally 3.5 to 19 mm. long (the wings sometimes vestigial); apex of clypeus usually truncate, sometimes rounded or concave, sometimes with a median tooth or notch; areolet present or rarely absent; second recurrent vein with one bulla, vertical or sloping inward slightly, so that outer hind corner of second discoidal cell is a right or obtuse angle and is not longer or sharper than outer front corner; dorsal rim of metanotum always with a small sublateral projecting tooth or angle opposite front end of lateral carina of propodeum; propodeum usually areolated, with the lateral longitudinal carina indicated at least basally; one or two transverse propodeal carinae present, the apical transverse carina usually the stronger or more persistent.

The Hemigasterini is almost worldwide in distribution but the bulk of the group is in the Holarctic region. Many of the species are parasitic in sawfly cocoons. *Polytribax*, however, parasitizes Lepidoptera, *Cubocephalus* parasitizes borers or sawfly pupae inside stems, and the host relations of many of the genera are unknown.

The tribes Hemigasterini, Rothneyiini, and Aptesini of previous classifications are here combined for the first time. Of the three former tribal names, Hemigasterini is chosen because it is based on the oldest generic name.

The genera of Hemigasterini, so far as described, are as follows:

Apophysius
Aptesis (= *Neleophron*, =*Pezoporus*)
Cnemocryptus
Cubocephalus (=*Cratocryptus*, =*Ecporthetor*, =*Microcryptus*, =*Pammachus*, =*Planocryptus*, =*Stenocryptus*)
Demopheles (=*Mecocryptus*)
Finchra
Giraudia (=*Calocryptus*, =*Colocnema*, =*Coelocryptus*, =*Pseudocryptus*)
Hemigaster (=*Asius*, =*Charmis*, =*Chreusa*, =*Cryptodema*)
Javra
Listrocryptus
Mansa (=*Colganta*, =*Pseudomansa*)
Megaplectes (=*Iocryptus*)
Monocryptus
Opidnus
Oxytaenia
Phyzelus
Plectocryptus=(*Aconias*)
Polytribax (=*Chasmocryptus*, =*Steriphocryptus*)
Rhembobius (=*Ulothymus*, =*Acanthocryptus*)
Rothneyia
Schenkia (=*Ecpaglus*, =*Schenckia*)

A revisionary study of the tribe would add some new genera, probably synonymize a few, and subdivide the genus *Cubocephalus*.

The genera *Hemigaster* and *Mansa* have some characters in common with the subtribe Baryceratina, tribe Mesostenini. These resemblances may be due either to close relationship or to convergence. The evidence in support of either possibility is inconclusive.

3. TRIBE MESOSTENINI

Front wing normally 3.5 to 27 mm. long (wings rarely vestigial); apex of clypeus various; areolet present or absent; second recurrent vein with one bulla, vertical or sloping inward slightly so that outer hind corner of second discoidal cell is a right or obtuse angle and is not longer or sharper than outer front corner, or rarely the second recurrent vein slopes outward (as in *Bozakites* and related genera); dorsal rim of metanotum entire, without a sublateral tooth or angle (except in some species of *Echthrus*), though a sublateral tooth or angle is sometimes present just below this dorsal rim; propodeum usually with only the two transverse carinae, the basal carina usually stronger and more persistent than the apical carina, often the median basal area and rarely additional areas defined by carinae.

This tribe has frequently been divided into two: the "Cryptini" with the areolet large and the Mesostenini with the areolet small. Such a division is quite artificial, as it separates closely related genera and groups together genera which are unrelated. Moreover, the size of the areolet is often intermediate, which makes the character impractical in application. The two tribes as divided formerly should be combined, and certain subtribes, based on more natural characters, made for the better handling of this very large group of genera. An attempt at subtribal divisions is made below. It seems probable that the Mesostenina, the largest subtribe, should be subdivided further. Future studies may point the best way to accomplish this.

Biology

The biology of the Mesostenini is in general like that of the rest of the Gelinae. Typically, the subfamily is parasitic in cocoons, usually lepidopterous cocoons but also cocoons of sawflies, of braconids and ichneumonids, of Neuroptera, of Gyrinidae, egg cocoons of spiders, puparia of Diptera, and nests of wasps. Some genera are parasitic on pupae in stems, and a few have gone beyond this habit to attack borers in wood. Females locate hosts pimarily by searching on foot, exploring with their antennae. Correlated with this habit the antennae of females are flexible, have a sensory area on the under side of the median and postmedian flagellar segments, and usually have a white median band (a ruptive color mark).

Oviposition is usually through the cocoon wall. The host pupa or prepupa is stung and usually killed or immobilized, and the egg laid externally. Normally there is one parasite per host but in a few groups gregarious parasitism is common. The rather uniform host relationship in the subfamily results in an ovipositor of rather uniform length, which in most species is somewhat over half the length of the abdomen. The species parasitic on borers, however, often have it longer, and the few that oviposit into larvae about to pupate instead of into cocoons (as in *Atractodes*) have it very short.

Males seem to search for females mostly by flying. Their flight usually has a dancing quality. Their antennae are longer than in females, more slender apically, less flexible, usually without a white band, and with sensory endings rather uniformly distributed. In most species there is a raised sensory area (tyloid) on the outer side of several of the postmedian flagellar segments.

Experimental biological data under natural conditions is almost nonexistent, but judging from field observations and dates of collections it seems safe to make the following generalizations for the subfamily: There are one or more generations per season. Males emerge on the average a little before females, mate with newly emerged females, and are somewhat shorter lived than females. Females, at least, are usually long-lived. Except for accidents or during dry weather, they live from emergence till near the end of the growing season. As a result, males are more common than females in the earlier part of the growing season, females more common near the end. Attrition is rather severe during the dry spells of midsummer, but for many species there is resurgence during the wetter, cooler weather that, at least in the eastern half of North America, usually comes with late summer. Final disappearance for the season begins with the autumnal hardening and drying of vegetation, and is accelerated by progressively harder frosts. A few species with a single generation per season appear in spring and disappear by mid-summer, but most are to be found through the growing season. Some, especially the species parasitic on borers, have a definite peak of abundance in late spring and early summer and a secondary peak during the damp part of early fall. In the West, in areas where there is little summer rain, most species are scarce by late summer, but in the part of the Southwest where late summer rains are the rule, mesostenines are more common then. Overwintering is usually in the host cocoon.

As usual with ichneumonids, adults take dew or rainwater from foliage regularly, feast at honeydew and extrafloral nectaries when these are available, and a few species (such as *Acroricnus*) regularly visit flowers with exposed nectaries. We have no records of females drinking blood of hosts, as is common in some other groups of parasitic Hymenoptera.

The Mesostenini share all these general characteristics of their subfamily. More specifically, the tribe contains most of the larger species of the subfamily, and species usually more definitely associated with foliage rather than with the soil surface or ground litter, as in a fair percent of the Gelini and Hemigasterini. Most of the Mesostenini occur in warm climates, while the Gelini and especially the Hemigasterini are better represented in temperate and cold climates.

In the tropics Mesostenini are the most conspicuous of all ichneumonids. A large proportion of the tropic and subtropic species have ruptive and mimicking color patterns and are very attractive in appearance. The southeastern United States has a good representation of species with tropical affinities. Their bright and varied color patterns usually are diagnostic of the species and the majority of our species of this group are illustrated in this paper for easy recognition. The species of Holarctic affinities usually have the black and red or fulvous colors with restricted white markings that are common to ichneumonids of more northern habitats.

Some of the Mesostenini, particularly those with tropical affinities, are more adept than most ichneumonids at stinging when captured. The collector soon learns to handle these with a little care.

Generic Groupings

The normal hosts are lepidopterous cocoons. One group (*Hidryta, Idiolispa,* and *Trychosis*) parasitizes spider egg cocoons. Some of the species of more northern distribution attack sawfly cocoons mainly or exclusively. In these the ovipositor tip tends to have the dorsal valve compressed and rather high, sharp along its dorsal edge, and strongly decurved beyond the nodus. *Trachysphyrus luctuosus* and *Habrocryptoides tsugae* have this style of ovipositor. One group of genera parasitizes mainly (or exclusively?) the thin but hard cocoons of Eucleidae. In these the dorsal valve of the ovipositor tip has a series of teeth or transverse ridges and is usually subcylindric. This group is separated as the new subtribe Baryceratina. In the Baryceratina we include also *Lamprocryptus* and *Glodianus.* These likewise have ridges on the dorsal valve of the ovipositor tip, but the tip is strongly compressed. Their hosts are unknown except that *Glodianus bombycivorus* was reared from a "bombycid cocoon."

Some of the genera regularly or occasionally parasitize borers of various kinds, and the adults, especially the females, show various degrees of modifications for this habit. In *Gambrus* some of the species attack cocoons in tunnels in succulent herbage. These are weakly specialized for parasitizing borers. They have a somewhat compressed ovipositor with the apical teeth in the form of subvertical ridges, a tendency for the last tarsal segment and its claws to be enlarged, and a tendency toward a cylindric body shape and inflation of the female front tibia. For some reason, they and other parasites of borers commonly have a median apical tooth on the clypeus. Some genera related to *Gambrus* seem to be regular parasites of cocoons in grass culms, and show a stronger modification. In these the ovipositor is rather short, definitely compressed, and the teeth appear as vertical ridges. The body shape is cylindric and head subspherical. *Mallochia*, *Kriegeria*, and *Amauromorpha* are examples of this group, and some species of *Isotima* show the same modifications, or are intermediate. A second group of genera, also related to *Gambrus* and not to be separated sharply from that genus, are parasites of cocoons or other hosts in herbaceous stems or in soft twigs. These have the same kinds of modifications as the group parasitic in grass culms but the body is less compact, clypeus wider and usually with a stronger median apical tooth, ovipositor usually longer, and teeth on ovipositor tip more widely spaced. *Aritranis*, *Caenocryptus*, *Caenocryptoides*, and *Idiostoma* are the genera involved, and probably also *Pycnocryptus* or part of the genus. The group parasitic in grass culms is largely tropical or subtropical; that parasitic in herbaceous stems mostly temperate in distribution. A third group of borer parasites, mostly tropical or subtropical, is parasitic on hosts in twigs, branches, woody stems, or tree trunks. They are rather highly specialized for these kinds of hosts, to the extent that they form an easily recognizable, and largely (entirely?) natural group. They are separated here as the new subtribe Echthrina. In these the body shape tends to be cylindric, head subspherical, clypeus wide and usually with a median tooth, lower tooth of mandible frequently longer than the upper tooth, female antenna with a special sensory area at the tip, female front tibia strongly inflated, fourth tarsal segment of female with an apical compact group of stout bristles, spiracle of first tergite usually near the middle, ovipositor more or less compressed, teeth on tip of ovipositor tending to be in the form of vertical ridges, lower valve of ovipositor nearly always with an apical dorsal lobe that encloses or partly encloses tip of upper valve, and subapical abdominal segments of female enlarged (to accommodate a high development of ovipositor muscles). All these characters are more or less directly associated with the habit of parasitizing borers, and are approached or sometimes matched by other mesostenine genera with hosts similar to those of the present subtribe. The subtribe Echthrina nevertheless seems to be a definable and useful grouping.

A number of genera are occasionally or habitually parasitic in the nests of wasps or bees. Some, like *Aritranis* and *Xylophrurus*, are normally borer parasites, and the parasites of Aculeata among them have made the slight shift from ovipositing into borers in twigs to ovipositing into wasp or bee nests in twigs. Such a shift seems to be easy, and to have such little significance that some ichneumonid species may parasitize indifferently either borers in twigs or aculeate nests in twigs. Others have made a more profound biological shift and usually the host preferences of entire genera are involved. These concern cases where the external characteristics of the nest are different from the usual hosts of the tribe, and the ichneumonids have developed special characteristics that fit them to locate such hosts, oviposit through the special texture of the nest into the host itself, and as a newly matured adult to cut a way out through the special nest texture to freedom. Some of the genera involved, like *Toechorychus* and *Pachysomoides*, are only a little modified for such host relations. In others the changes have been more profound, resulting in characters that set them apart from other mesostenines. The more modified genera may be divided into two groups, which are here recognized as subtribes: the Sphecophagina adapted to parasitizing the paper nest cells of social Vespidae, and the Nematopodiina adapted to parasitizing the mud cells of solitary Vespidae, Psammocharidae, and Sphecidae. In the Sphecophagina, the short ovipositor and short mandibles are obviously adapted to its peculiar hosts. In the Nematopodiina, the longer ovipositor, usually with coarse apical teeth, and the picklike mandible are adapted to drilling through a mud-nest wall for ovipositing and to cutting out as an adult. Judging from the diversity of the ovipositor of the nematopodiine genera, however, the host range may include some things other than aculeate nests. (The ovipositor of *Nematopodius* itself, for example, is quite different from that of the rest of the tribe. There are no rearing records for this genus.)

Thus we classify certain host-specialized groups of mesostenine genera as distinct subtribes, leaving the great bulk of the genera, including probably the less specialized representatives of all or most of the evolutionary lines, in the large subtribe Mesostenina. Since the main characters of the new subtribes are clearly adaptive, it is reasonable to suspect, and some evidence supports the supposition, that not all of the new subtribes are monophyletic. Convergence may have obscured some of the true relations. The present subtribal divisions should prove useful, however, and are steps toward a natural classification.

Checklist of Genera of Mesostenini, by Subtribes

The list below is arranged by relationships, according to the present rudimentary understanding of these, and according to the limitations of a linear sequence. New synonyms are marked with an asterisk. The described genera of the world are included except for *Allophatnus*, *Scenopathus*, *Neomesostenus*, and *Cylindrocryptus*. Of these missing genera, we have seen only *Neomesostenus*. Our notes on *Neomesostenus* are not sufficient to place it with certainty but it is likely related to *Lymeon*. *Allophatnus* and *Scenopathus* belong probably in the Mesostenina. *Cylindrocryptus* may belong in the Mesostenina or in the Hemigasterini. The identity of *Hoeocryptus* is uncertain. We have not seen an authentic specimen but list it in the synonymy of *Brachycoryphus* on the authority of Roman (1910, Ent. Tidskr., vol. 31, p. 149).

1. SUBTRIBE BARYCERATINA

Lamprocryptus Schmiedeknecht. Neotropic. (=*Trapezonalis**).
Glodianus. Neotropic.
Ceratomansa. Australian.
Whymperia. Neotropic and Nearctic. (=*Protocryptus**, =*Zamansa*).
Neoparacryptus (=*Paracryptus* Uchida). Eastern Palearctic and Oriental.
Paragambrus. Eastern Palearctic.
Buysmania. Oriental.
Lamprocryptidea. Neotropic. (=*Haplomus* Szépligeti*, =*Aplomiana*).
Baryceros. Neotropic and Nearctic (=*Christolia*, =*Crypturopsis*, =*Neochristolia*).
Chlorocryptus. Oriental and eastern Palearctic. (=*Cochlidionostenus*, =*Cryptaulaxoides*).
Coccygodes Saussure. Ethiopian. (=*Cryptaulax* Cameron, =*Ateleonotus*, =*Coccygodes* Seyrig*).

2. SUBTRIBE MESOSTENINA

Apsilops. Holarctic and Oriental. (=*Heterotypus*, =*Dapanus*, =*Sobas* Foerster, =*Trichocryptus*, =*Neostricklandia*, =*Trichestema*).
Agrothereutes. Holarctic. (=*Spilocryptus*, =*Dayro*).
Gambrus. Holarctic. (=*Kaltenbachia*, =*Hygrocryptus*, =*Allocryptus*).
Cyanodolius. Madagascan.
Mesostenidea. Palearctic.
Piambia. Madagascan.
Phaedraspis. Oriental. (=*Stictocryptus* Cameron 1907).
Isotima. Old World tropics. (=*Formostenus*, =*Gambroides*, =*Vadonina*, =*Fotsiforia*).
Goryphus. Old World tropics. (=*Skeatia*, =*Latteva*, =*Ancaria*, =*Fenenias*, =*Holia*).

Fislistina. Oriental and Australian. (=*Cratocryptus* Cameron, =*Loiada*, =*Cratocryptodes*, =*Cratocryptoides*).

Brachycoryphus. Ethiopian and Oriental. (=*Psacus* Holmgren, =*Hoeocryptus?*, =*Miramilia*).

Vagenatha. Oriental. (=*Acleasa*).

Mallochia. Neotropic and Nearctic.

Kriegeria. Oriental.

Amauromorpha. Oriental. (=*Eripternimorpha*).

Aritranis. Holarctic. (=*Hoplocryptus*).

Cacnocryptus. Palearctic.

Caenocryptoides. Eastern Palearctic.

Idiostoma Cameron. Ethiopian.

Lorio. Australian.

Pycnocryptus. Holarctic.

Ischnus. Mostly Oriental and Holarctic. (=*Habrocryptus*, =*Aglaocryptus*, =*Erythrocryptus*).

Habrocryptoides. Holarctic, Oriental, and Neotropic. (=*Pseudischnus**).

Dicamixtus. Neotropic.

Melanocryptus. Neotropic.

Lobocryptus. Neotropic.

Hoplophorina. Neotropic.

Odontocryptus Saussure. Madagascan. (=*Odontocryptus* Seyrig*).

Zonocryptus. Ethiopian. (=*Oneilella**, =*Stenaulax**, =*Stenomeris**, =*Neocryptus**, =*Ancylocnema**).

Trachysphyrus. Worldwide. (=*Cryptus* Fabricius, =*Meringopus*, =*Itamoplex*, =*Goniocryptus*, =*Cosmiocryptus*, =*Cyanocryptus*, =*Buathra*, =*Hedycryptus*, =*Plesiocryptus*, =*Bathycrisis*, =*Lamprocryptus* Cameron, =*Mesocryptus* Szépligeti, =*Pseudomesocryptus*, =*Nippocryptus*, =*Neocryptopteryx*).

Chromocryptus. Nearctic and Neotropic. (=*Mesostenimorpha*).

Dotocryptus. Neotropic.

Cryptopteryx. Neotropic.

Neodontocryptus. Eastern Palearctic. (=*Odontocryptus* Uchida).

Lanugo. Nearctic and Neotropic.

Reptatrix. Nearctic.

Synechocryptus. Mediterranean and Ethiopian. (=*Rhynchocryptus**).

Compsocryptus. Nearctic and Neotropic. (=*Cryptoideus*, =*Callicryptus*, = *Stictocryptus* Cameron 1908).

Joppidium. Nearctic and Neotropic. (=*Joppoceras*, =*Opisoxestus*, =*Isocryptus**).

Myrmeleonostenus. Palearctic and Oriental.

Hidryta. Holarctic. (=*Brachycryptus*, *Euthycryptus**).

Idiolispa. Holarctic. (=*Liocryptus*, =*Paracryptus* Szépligeti).

Trychosis. Holarctic and Oriental. (=*Ethaemorpha*, =*Orthocryptus*, =*Phaedrophadnus*).

Coesula. Oriental. (=*Striatostenus*).

Piasites. Madagascan.

Tolonus. Madagascan. (=*Mavia**, =*Mascarella**).

Rarivia. Madagascan.

Lemurella. Madagascan.

Madastenus. Madagascan. (=*Ceratella**, =*Soratsia**, =*Hegemonites**).

Ceratophenax. Madagascan.
Larpelites. Ethiopian.
Etha. Oriental.
Afrocryptus. Madagascan.
Mesophragis. Madagascan.
Necolio. Oriental, Australian, and eastern Palearctic.
Tsiavikites. Madagascan.
Friona. Oriental. (=*Lactolus*).
Takastenus. Oriental and Australian.
Buodias. Oriental. (=*Melcha*).
Irabatha. Australian.
Afretha. Madagascan.
Nematocryptus. Ethiopian. (=*Betsifia**).
Savolia. Madagascan.
Menaforia. Ethiopian and Oriental.
Tsirambia. Madagascan.
Perinetia. Madagascan.
Hemisphragia. Ethiopian, eastern Palearctic, and eastern Nearctic. (=*Micromavia**).
Diapetimorpha. Neotropic and Nearctic.
Bicryptella. Neotropic. (=*Cryptella* Szépligeti).
Lymeon. Neotropic and Nearctic. (=*Christolimorpha**, =*Zamastrus**, =*Neogoryphus**, =*Nasutocryptus**).
Toechorychus. Neotropic.
Pachysomoides. Neotropic and Nearctic. (=*Pachysoma* Szépligeti, =*Polistiphaga**).
Acerastes. Neotropic and Nearctic.
Polycyrtidea. Neotropic.
Ignambia. Australian.
Erythromesostenus. Australian.
Stiromesostenus. Australian.
Foveolia. Madagascan.
Diloa. Oriental and Australian.
Bozakites. Madagascan.
Desia. Madagascan.
Trafana. Madagascan. (=*Clypeites**, =*Ilobia**).
Listrognathus. Almost worldwide. (=*Mesostenoideus*, =*Suvalta*).
Cremnocryptus. Oriental and Australian.
Gotra. Oriental and Australian. (=*Stenaraeoides*, =*Palmerella*).
Cryptanura. Neotropic and Nearctic. (=*Polyaenus*, =*Polyaenidea*).
Chamula. Neotropic and Nearctic.
Ceratodolius. Madagascan.
Lavinifia. Madagascan.
Ivondrites. Madagascan.
Camera. Neotropic and Nearctic.
Mesostenus. Almost worldwide. (=*Stenaraeus*, =*Umlima*, =*Derocentrus*).
Rambites. Madagascan.
Polycyrtus. Neotropic and Nearctic. (=*Cryptanuridimorpha*, =*Cryptopterigimorpha*, =*Polycyrtimorpha*).
Ceratocryptus. Old World tropics. (=*Pyralophagus*).

Fitatsia. Ethiopian and Oriental.
Silsila. Oriental.

3. SUBTRIBE NEMATOPODIINA

Iaria. Australian.
Sphecoctonus. Madagascan.
Stenarella. Old World tropics and subtropics. (=*Parasilsila* =*Orientostenaraeus*).
Picardellia. Old World tropics and subtropics. (= *Borciella,* =*Nipporicnus,* =*Paretha*).
Photocryptus. Neotropic. (=*Poecilocryptus* Kriechbaumer, =*Neosprynchotus**, =*Pyrrhocryptus**, =*Stilpnoderes**).
Messatoporus. Neotropic and Nearctic.
Nematopodius. Palearctic, Oriental, and Australian. Divisible into three subgenera: *Nematopodius* (=*Leptocryptus* Cameron, =*Hemiphatnus*); *Diapetus* (=*Mesostenopsis,* =*Earrana,* =*Parca* Morley, =*Esuchonematopodius*); and *Microchorus.*
Acroricnus. Holarctic, Oriental, and Caribbean. (=*Xenocodon,* =*Macrobatus,* =*Linoceras,* =*Leptobatides,* =*Agathobanchus*).
Osprynchotus. Ethiopian. (=*Distantella*).

4. SUBTRIBE ECHTHRINA

Xoridesopus. Oriental. (=*Miophatnus*).
Dagathia. Oriental.
Schreineria. Ethiopian, Palearctic, and Oriental. (=*Sycophrurus,* =*Pseudotorbda,* =*Pygidites*).
Microstenus. Oriental.
Hadrocryptus. Oriental. (=*Hoplonopsis*).
Eurycryptus. Old World tropics. (=*Alriada,* =*Neotorbda,* =*Didiaspis*).
Pharzites. Oriental.
Xanthocryptus. Australian. (=*Lorentzia* Cameron).
Wuda. Australian.
Xylophrurus. Holarctic. (=*Nyxeophilus,* =*Xylophruridea,* =*Macrocryptus*).
Nesolinoceras. Neotropic.
Apocryptus. Oriental and eastern Palearctic.
Digonocryptus. Neotropic. (=*Monogonocryptus**, =*Odontocryptus* Szépligeti*).
Echthrus. Holarctic. (=*Sphaetes,* =*Karaechthrus**, =*Bioleter**).
Dinocryptus Cameron. Oriental. (=*Megacryptus,* =*Dinocryptus* Szépligeti, =*Dinocryptiella*).
Torbda. Oriental and eastern Palearctic.
Anepomias. Madagascan.
Gabunia. Ethiopian. (=*Metarhyssa,* =*Nadia*).
Pterocryptus. Palearctic and Oriental.
Agonocryptus. Neotropic and Nearctic.
Cryptohelcostizus. Nearctic.
Helcostizus. Holarctic. (=*Brachycentrus* Taschenberg, =*Cyrtocryptus,* =*Heterocryptus,* =*Mesocryptus* Thomson, =*Asternaulax,* =*Chenbergus*).

5. SUBTRIBE SPHECOPHAGINA

Arthula. Oriental and Australian. (=*Orientocryptus*).
Latibulus. Oriental and Southern Palearctic. (=*Crypturus* Gravenhorst, =*Endurus*, =*Kuniocryptus*).
Sphecophaga. Holarctic. (=*Chyronomon*, =*Cacotropa*).

New Nomenclature for Genotypes

The new generic synonymy in the above list implies new generic combinations for the genotypes concerned. These are listed below, and the occasion is taken to list also some new specific synonymy for them.

Three of the generic names do not yet have genotypes. We designate two of them as follows:

Coccygodes nobilis Saussure for *Coccygodes* Seyrig
Trapezonalis fuscipennis Szépligeti for *Trapezonalis*

Neomesostenus still lacks a genotype. We intend to select one after the several species that could be designated have been studied again.

Other species than the genotypes now stand under some of the synonymized generic names. These may or may not be congeneric with the genotypes. Their individual cases need separate attention, but except for the Nearctic species they are outside the scope of this work. The generic position of some of them will be treated in catalogs which are in preparation.

NEW COMBINATIONS AND NEW SYNONYMY

Ancylocnema pulchripennis Szépligeti, 1916=*Zonocryptus pulchripennis* (Szépligeti).
Betsifia orbitalis Seyrig, 1952=*Nematocryptus orbitalis* (Seyrig).
Bioleter eos Meyer, 1930=(*Karaechthrus*) *Echthrus tuberculatus* (Uchida, 1930), new combination. New synonymy.
Ceratella anteforealis Seyrig, 1952=*Madastenus anteforealis* (Seyrig).
Christolimorpha plesius Viereck, 1913=*Lymeon plesium* (Viereck).
Clypeites bidens Seyrig, 1952=*Trafana bidens* (Seyrig).
Cryptaulax ruficeps Cameron, 1906=*Coccygodes ruficeps* (Cameron).
Cryptus aztecus Cresson, 1873=*Whymperia azteca* (Cresson).
Cryptus formosus Brullé, 1846=*Zonocryptus formosus* (Brullé).
Cryptus xanthopus Brullé, 1846=*Zonocryptus xanthopus* (Brullé).
Digonocryptus bidens Viereck, 1913=(*Mesostenus*) *Digonocryptus crassipes* (Brullé, 1846), new combination. New synonymy.
Distantella apicalis Schmiedeknecht, 1908=*Photocryptus apicalis* (Schmiedeknecht).
Euthycryptus scrobiculifer Jussel, 1907=*Hidryta scrobiculifer* (Jussel).
Haplomus pulcher Szépligeti, 1916=*Lamprocryptidea pulchra* (Szépligeti).
Hegemonites elongata Seyrig, 1952=*Madastenus elongatus* (Seyrig).
Ichneumon ariolator Linnaeus, 1758=*Lymeon ariolator* (Linnaeus).

Ilobia lugatoria Seyrig, 1952 = *Trafana lugatoria* (Seyrig).
Ischnus oregonensis Cushman, 1939 = *Habrocryptoides oregonensis* (Cushman).
Isocryptus azureus Brèthes, 1927 = (*Alomya*) *Joppidium mocrens* (Perty, 1833), new combination. New synonymy.
Karaechthrus tuberculatus Uchida, 1929 = *Echthrus tuberculatus* (Uchida).
Mascarella purgatoria Seyrig, 1952 = *Tolonus purgatorius* (Seyrig).
Mavia curvicauda Seyrig, 1952 = *Tolonus curvicauda* (Seyrig).
Mesostenus arvalis Cresson, 1872 = (*Mesostenus*) *Pachysomoides fulvus* (Cresson, 1864), new combination.
Micromavia carinata Seyrig, 1952 = *Hemisphragia carinata* (Seyrig).
Monogonocryptus diversicolor Viereck, 1913 = *Digonocryptus diversicolor* (Viereck).
Nasutocryptus nasutus Pratt, 1945 = *Lymeon nasutum* (*Pratt*).
Neocryptus superbus Szépligeti, 1916 = *Zonocryptus superbus* (Szépligeti).
Neosprynchotus sphecophagus Schrottky, 1915 = *Photocryptus sphecophagus* (Schrottky).
Odontocryptus spiniculatus Seyrig, 1952 = *Odontocryptus spiniculatus* Saussure. New synonymy.
Odontocryptus variegatus Szépligeti, 1916 = *Digonocryptus variegatus* (Szépligeti).
Pachysoma albopictum Szépligeti, 1916 = (*Mesostenus*) *Pachysomoides stupidus* (Cresson, 1873), new combination. New synonymy.
Protocryptus grandis Schmiedeknecht, 1908 = *Whymperia grandis* (Schmiedeknecht).
Rhynchocryptus violaceipennis Cameron, 1905 = *Synechocryptus violaceipennis* (Cameron).
Soratsia bellicosa Seyrig, 1952 = *Madastenus bellicosus* (Seyrig).
Stenaulax rufipes Cameron, 1906 = *Zonocryptus rufipes* (Cameron).
Stilpnoderes apicipennis Brèthes, 1927 = *Photocryptus apicipennis* (Brèthes).
Trapezonalis fuscipennis Szépligeti, 1916 = *Lamprocryptus fuscipennis* (Szépligeti).
Zamastrus photopsis Viereck, 1913 = *Lymeon photopsis* (Viereck).

Faunal Relations

The Mesostenini in America north of Mexico comprises 39 known genera, 235 species, and 73 additional subspecies. According to faunistic relations, the genera may be divided into the three series in which they are discussed below: 1, Holarctic group; 2, Sonoran group; 3, Neotropic group. *Reptatrix* and *Cryptohelcostizus* are the only genera restricted to our area. Of these it is probable that the former and certain that the latter will prove to occur also in the Mexican fauna.

HOLARCTIC: This group of genera includes *Apsilops*, *Agrothereutes*, *Gambrus*, *Aritranis*, *Pycnocryptus*, *Ischnus*, *Habrocryptoides*, *Trachysphyrus*, *Hidryta*, *Idiolispa*, *Trychosis*, *Hemisphragia*, *Listrognathus*, *Mesostenus* (Transfuga Group), *Acroricnus*, *Xylophrurus*, *Echthrus*, *Helcostizus*, and *Sphecophaga*. These genera, or at least those sections of the genera that are represented in the Nearctic fauna, occur primarily in the Nearctic and Palearctic regions. Our species are mostly northern in distribution, many of them reaching their southern limits in the Transition or Upper Austral zones. Some of them are Holarctic, or have very close relatives in Eurasia. Specific limits between the species as they occur in America have usually been clear enough when we have had sufficient material, but some questions of specific identity with Eurasian forms remain unanswered (or even unasked) for lack of specimens. Since our area is part of the center of distribution of these genera some of the generic distinctions have to be partly arbitrary, there being some species with intermediate characters. The distinctions between *Agrothereutes*, *Gambrus*, *Aritranis*, and *Pycnocryptus*; the distinction between *Habrocryptoides* and *Trachysphyrus*; and that between *Hidryta* and *Idiolispa* are cases in point.

Faunal connections with Eurasia are through the Bering Strait area. In general, the species, subspecies, or races in western and northwestern North America are more like those in Eurasia than are the species, subspecies, or races in the eastern and southern parts of North America. Those species that are Holarctic tend to range to the Northwest or to be restricted to that area. The strictly eastern species appear not to occur also in Eurasia. Exceptions to the above generalizations are *Hemisphragia*, *Trachysphyrus moschator*, and *Pycnocryptus director*. The case of *Hemisphragia* is discussed below. *Pycnocryptus director* is known to have been introduced to America within the last fifty years, so its occurrence only in eastern America is not from natural spread. The case of *Trachysphyrus moschator* may be due to incomplete collections.

The genera meriting special mention are as follows: *Habrocryptoides* seems to be a relict group, with species scattered over Eurasia and North and South America. The faunal relations of our species are unclear. *Hemisphragia* is another genus with a relict distribution. We know two species from Madagascar, one from China, and one from southeastern United States. A faunal connection between China and southeastern United States is rather common among groups inhabiting moist, temperate, deciduous forests, and the case of *Hemisphragia* seems to be another illustration of this. *Trachysphyrus* is a widespread genus, but our species belong to groups that are entirely or largely Holarctic in distribution, except possibly for *T. rugosiscutum*. This latter species appears to have Neotropic affinities.

SONORAN: This group of genera includes *Lanugo*, *Reptatrix*, *Compsocryptus*, *Joppidium*, *Mesostenus* (Longicaudis group), and *Cryptohelcostizus*. Of these, *Cryptohelcostizus* is related perhaps to the largely Eurasian and African genus *Schreineria*. It has not yet been taken in Mexico but doubtless will be when collecting there is more intense. The Longicaudis group of *Mesostenus* is an American species group of uncertain affinities. The other four genera are related to *Trachysphyrus*. The distribution of these groups includes mostly Mexico and southwestern United States, with some species in Central America and a few in South America. All are strictly American. In our area, a few species of the group range as far northward as southern British Columbia, and one or a few species of each genus except *Reptatrix* occur in southeastern United States. *Reptatrix* now contains a single species from northwestern United States, but some undescribed Mexican species are related to it and possibly should be included in the genus.

NEOTROPIC: This group of genera includes *Whymperia*, *Baryceros*, *Mallochia*, *Chromocryptus*, *Diapetimorpha*, *Lymeon*, *Pachysomoides*, *Acerastes*, *Polycyrtidea*, *Cryptanura*, *Chamula*, *Camera*, *Polycyrtus*, *Messatoporus*, and *Agonocryptus*. These genera are strictly American, with their general centers of distribution in the Neotropics. They invade the southern portion of the Nearctic region, but there occur mostly in southeastern United States, in contrast to the Sonoran group of genera which are better represented in the Southwest. Four of the genera (*Whymperia*, *Polycyrtidea*, *Chamula*, and *Camera*) are represented in our area only by single species along the southern border. *Chromocryptus* has a single widespread species. The rest of the genera are better represented in the Austroriparian and Carolinian faunas. *Baryceros*, *Mallochia*, and *Lymeon* each has a single species along the southwestern border of the United States and several species in the Southeast. *Diapetimorpha*, *Acerastes*, *Cryptanura*, *Polycyrtus*, and *Agonocryptus* occur only in the Southeast. *Pachysomoides* and *Messatoporus* range over most of the United States and southern Canada but have more species in the Southeast than elsewhere.

In the Nearctic region we have just a fringe of these primarily Neotropic genera. With us, the genera and species are easy to differentiate, but in the Neotropics the very large complexes that occur make some taxonomic problems of monumental proportions. Inexperienced workers with Neotropic material at hand should not be deceived by the bright colors and strong sculptural characters that seem to make the distinction and description of the species so easy. More complete collections would force an appreciation of the tremendous number of closely related and variable species, subspecies, and genera, which to be treated in a useful way will require larger collections than have yet been assembled, and more time than a casual worker can give.

Key to the subtribes of Mesostenini

1. Mandible about 4.5 as long as its width at the middle, its upper tooth much longer than its lower tooth, the lower tooth sometimes indistinct; clypeus broad, its apical margin broadly truncate or concave, without a median tooth or lobe; first abdominal segment slender, only a little widened apically. **3. Nematopodiina** (p. 461)

   Mandible about 1.5 to 3.5 as long as its width at the middle, its upper tooth not or little longer than its lower tooth; clypeus usually narrower, its apical margin various, often with a median tooth or lobe; first abdominal segment various, usually stouter and apically more strongly widened. (Rarely, as in *Compsocryptus buccatus*, the mandible is as described for the Nematopodiina, but in these exceptions the first abdominal segment is stouter and more distinctly widened apically.) 2

2. Wings of normal size, longer than thorax 3

   Wings abnormally small, shorter than thorax 6

3. Ovipositor not surpassing tip of abdomen; female subgenital plate broad, rhomboidal, weakly convex; second intercubital vein absent, not present even as a trace. (In *Sphecophaga*, the only Nearctic genus, the first intercubital is about 6 times as long as its width. In the other Nearctic Mesostenini that lack the second intercubital, the first intercubital is relatively shorter.) . . . . **5. Sphecophagina** (p. 522)

   Ovipositor nearly always surpassing tip of abdomen; female subgenital plate not large and rhomboidal; second intercubital vein usually present, if absent there is usually a trace left 4

4. Spiracle of first tergite at, a little in front of, or a little behind the middle; lower valve of ovipositor near apex with a dorsal lobe that encloses or partly encloses upper valve of ovipositor (fig. 329,p) (except in *Helcostizus* and in some species of *Echthrus*); ovipositor compressed; front tibia of female inflated, suddenly constricted at base; fourth tarsal segment of female with a dense apical group of stout bristles on the under side, the apical margin of the fourth tarsal segment not or very weakly bilobed; apex of female flagellum more or less truncate. (This group is easy to recognize in the female but more difficult in the male. Males of all Nearctic genera except *Xylophrurus* may be distinguished from the Mesostenina and Baryceratina by the fact that the spiracle of the first tergite is at or in front of the middle. *Xylophrurus* males may be distinguished by the combination of a small clypeus (about 0.5 as wide as face) with a sharp median apical point, and the large pentagonal areolet.) . . . . **4. Echthrina** (p. 476)

   Spiracle of first tergite varying in position from a little behind to far behind middle; lower valve of ovipositor near apex without a dorsal lobe that encloses or partly encloses upper valve of ovipositor (except in a few exotic genera: *Kriegeria*, *Amauromorpha*, *Dotocryptus*, and an undescribed Neotropic genus); ovipositor cylindric or more or less compressed; front tibia of female usually not inflated but sometimes moderately inflated; fourth tarsal segment of female either without a dense apical group of stout bristles on the under side, or if it has such bristles the apical margin of the segment is bilobed; apex of female flagellum a rounded point 5

5. Upper valve of ovipositor with a series of teeth or transverse oblique ridges between nodus and apex; flagellum usually rather short and thick; thorax usually rather short and thick. (This group is easy to recognize in the female but not in the male. In the Nearctic region there are only two genera: *Whymperia* and *Baryceros*. Since males of these may easily be mistaken

for Mesostenina, they are included in the key to the Nearctic genera of that subtribe, at couplets 1 and 28.) . . . . **1. Baryceratina** (p. 21)
Upper valve of ovipositor without a series of teeth or transverse ridges between nodus and apex, or rarely (as in some species of *Gambrus* and *Apsilops*) with a few weak teeth (but not ridges) just beyond the nodus.
2. Mesostenina (p. 32)

6. Females only; apex of clypeus weakly convex; ovipositor extending conspicuously beyond apex of abdomen; fourth tarsal segment bilobed at apex (see from below) . . . **2. Mesostenina** (some females of *Agrothereutes*) (p. 32)
Females (and males?); apex of clypeus truncate or concave; ovipositor not extending beyond apex of abdomen; fourth tarsal segment not bilobed at apex . . . . **5. Sphecophagina** (some specimens of *Sphecophaga*) (p. 522)

1. Subtribe Baryceratina

Clypeus usually moderately small, moderately convex, its apical edge truncate, often with a weak median angle or pair of points; mandible 2.0 to 2.5 as long as it is wide at the middle, its upper tooth somewhat larger than the lower tooth; flagellum rather thick and short, in female the apical half often a little thicker than basal half; tip of last segment of female flagellum narrowed to a rounded point; thorax usually stout, the mesoscutum often broad and weakly convex, the propodeum usually short; propodeal spiracle elliptic or elongate; front tibia of female not inflated; fourth tarsal segment of female bilobed apically (see from below), with strong bristles beneath, especially toward its apex; areolet small, medium sized, or large, sometimes open apically, usually approximately square or rectangular in shape; first tergite rather strongly expanded apically, its spiracle well behind the middle; ovipositor of moderate length or sometimes rather long, stout, subcylindric or compressed, its tip with a series of teeth or transverse or oblique ridges on dorsal valve between nodus and apex.

The most distinctive characteristic of the subtribe is the ovipositor tip, which has a series of oblique grooves on the dorsal valve, so that the dorsal as well as the ventral valve is serrate. The body shape is usually stout, with the thorax short, abdomen rather short, flagellum usually rather stout, and ovipositor of moderate length, or sometimes long in *Glodianus*. The areolet varies from small to large. In two genera it is open.

This relatively small group is widely scattered over the globe. It seems reasonable that the genera contained in it are all phyletically related, but it could be that the ovipositor morphology is a convergent development correlated with its use for piercing the thin dense cocoons of the Eucleidae, and that the usually stout thorax is only a correlation with development in the subspherical cocoons of the hosts. The subtribe Baryceratina is proposed as a convenient unit, which has a good chance of proving to be natural. Further studies will test its validity.

We have two genera: *Whymperia*, which is mostly Neotropic but with a single species in southern Arizona, and *Baryceros*, a rather large genus with most of its species Neotropic and five in our area.

Key to the Nearctic genera of Baryceratina

1. Frons with a strong sublateral carina that extends upward from outer margin of antennal socket (fig. 307,a); areolet of moderate size, closed (fig. 307,a); nervellus broken near or above middle . . . . . . **1. Whymperia** (p. 22)

   Frons without a strong sublateral carina (fig. 307.b); areolet very small, open (fig. 307,b); nervellus broken below middle . . . . **2. Baryceros** (p. 23)

1. Genus Whymperia

Figure 307,a

Whymperia Cameron, 1903, Entomologist, vol. 36, p. 122. Type: *Whymperia carinifrons* Cameron; monobasic.

Protocryptus Schmiedeknecht, 1904, Opuscula ichneumonologica, fasc. 6, p. 414. New synonymy. Type: *Protocryptus grandis* Schmiedeknecht; designated by Viereck, 1914.

Zamansa Viereck, 1912, Proc. U.S. Nat. Mus., vol. 42, p. 647. Type: *Cryptus aztecus* Cresson; original designation.

Front wing 8 to 18 mm. long; frons with a basinlike depression just above antennal sockets and a strong vertical carina extending dorsad from outer margin of each antennal socket; setiferous punctures on mesopleurum varying from very fine and dense to moderately small and moderately dense; epomia absent or very faint; upper edge of pronotum simple or with a moderate submarginal swelling; mesoscutum rather weakly convex, its notaulus short and weak, or absent; basal carina of propodeum sharp, usually complete, sometimes obsolescent; apical carina of propodeum sharp, complete or interrupted at middle, often forming a long, oblique, rudimentary sublateral crest; areolet of moderate size, roughly oblong but its front side longer than its hind side, receiving second recurrent vein near its middle; nervulus opposite basal vein; nervellus broken near or above middle; ovipositor cylindric, the tip of its upper valve with weak transverse ridges.

Whymperia contains a number of Neotropic species and one in southern Arizona.

Whymperia tricolor, new species

Figure 330,a

Male: Unknown.

Female: Front wing 11.5 mm. long; general structure and proportions as shown in figure 307,a; punctures on thorax moderately coarse, strong, and close. The basin on the frons that is bordered laterally by a carina is both shorter and a little narrower than in other species of the genus.

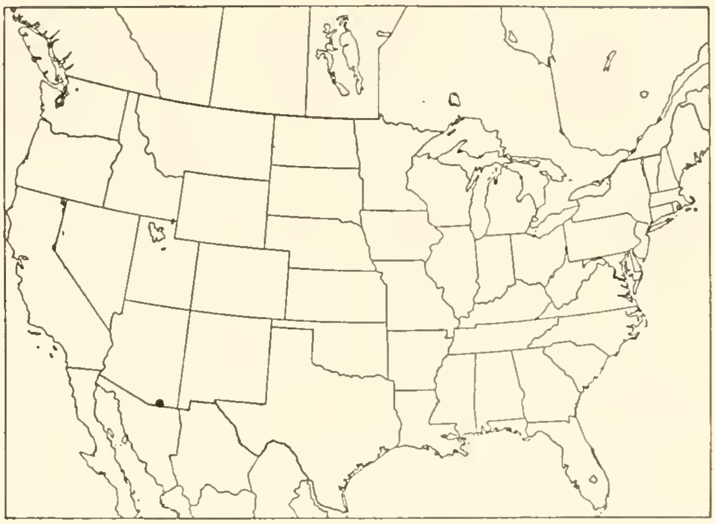


FIGURE 1.—Locality for *Whymperia tricolor.*

Head and body colored with black, ivory, yellow, and fulvous as in figure 330,a; palpi fulvous; scape fulvous, infuscate above; pedicel and flagellum black, the flagellum with a complete white band that covers about 8 segments; front and middle legs fulvous, their coxae ivory in front and with a fuscous mark at base, the fifth segments of their tarsi fulvous brown; hind coxa colored as in figure; hind trochanters, femur, and tibia fulvous; hind tarsus yellow, its fifth segment fulvous; wings with a moderate brownish suffusion.

Type: ♀, Huachuca Mts., Ariz., Oct. 12, 1951, E. L. Kessel (San Francisco).

Paratype: ♀, same data as type (San Francisco).

2. Genus Baryceros

FIGURE 307,b

Baryceros Gravenhorst, 1829, Ichneumonologia europaea, vol. 2, p. 777. Type: *Baryceros guttatus* Gravenhorst; monobasic.

Christolia Brullé, 1846, *in* Lepeletier, Histoire naturelle des insectes, hyménoptères, vol. 4, p. 246. Type: *Christolia punctata* Brullé; monobasic.

Crypturopsis Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 45. Type: *Crypturus texanus* Ashmead; original designation.

Neochristolia Blanchard, 1936, Rev. Argentina Ent., vol. 1, p. 40. Type: *Neochristolia eucleides* Blanchard; original designation.

Front wing 5.5 to 16 mm. long; body stout; frons without a horn, without a basinlike depression, and without a sublateral vertical carina; clypeus of moderate size, moderately convex, impressed apically, its apical margin truncate; flagellum usually short in male, moderately long and rather thick in female; epomia rather strong, straight, ventrally paralleling front margin of pronotum; upper margin of pronotum with a strong swelling at upper end of epomia; mesoscutum short, wide, and weakly convex; notaulus sharp or more or less obsolete, not extending beyond center of mesoscutum; setiferous punctures on mesopleurum moderately dense; sternaulus extending the length of mesopleurum, weaker on its apical 0.3; basal carina of propodeum usually weak or absent medially but always strong and complete laterally; propodeal tubercles strong but short and rounded; apical propodeal carina absent but represented by the pair of tubercles; areolet small, almost square, open; nervulus at or a little distad of basal vein; nervellus broken near its lower end; postpetiole smooth or with traces of median longitudinal carinae, impunctate, its lateral face separated from dorsal by a rounded angle; ovipositor cylindric, the tip of its upper valve with moderately strong transverse ridges.

The generic name *Baryceros* has not been in use because of a mistake in the type locality of the originally included species. It was described as European, but no one has been able to rediscover it in Europe. Examination of the type in Wroclaw, Poland, in 1958, showed that it belongs to this genus, and to a species common in the Guianas. The name *Christolia*, a synonym of *Baryceros*, was based on a specimen from Brazil, described as a female but probably a male. The type is lost, but the original description agrees with the genus *Baryceros* very well.

The genus is exclusively American, with a large number of species in the Neotropic region and five in the Nearctic. Since our species are rather uniform in structure the descriptions of structure given below are only in comparison with *B. audax*, which is considered the norm for the Nearctic species.

As in other genera of the subtribe, the species parasitize cocoons of Eucleidae. Adults occur in sunlit places or in semishade, among deciduous trees and bushes—the same habitat that is characteristic of the eucleids.

Keys to the Nearctic Species of Baryceros

MALES

1. Hind tarsus black; notaulus indistinct; white spot on lower part of mesopleurum ovoid, its front end not curved upward; hind coxa fulvous and white. **5. texanus** (Ashmead)
   Hind tarsus white or mostly white; notaulus distinct; white spot on lower part of mesopleurum elongate with its front end curved upward, or broken into two spots 2
2. Hind coxa fulvous, with a basal white spot above; mesosternum entirely black . . . . **4. halli,** new species
   Hind coxa black and white; mesosternum more or less white, at least with a white spot next to sternaulus 3
3. Mesosternum almost entirely white . . . . **2. fortis** (Cresson)
   Mesosternum black, with a white spot or stripe next to sternaulus . . . 4
4. Orbital white band complete, or weakly interrupted near top of hind orbit; last segment of hind tarsus white with its apical 0.5 to 0.6 blackish (as seen from above) . . . . **1. candidus** (Cresson)

Orbital white band incomplete, with a definite interruption near top of hind orbit; last segment of hind tarsus white with its apical 0.1 to 0.4 blackish. **3. audax** (Cresson)

FEMALES

(The female of *halli* is unknown.)

1. Second and following tergites fulvous . . . . **1. candidus** (Cresson)
   Second and following tergites black margined with white 2
2. Lower part of mesopleurum with a single, large, sublongitudinal white spot; notaulus indistinct . . . . **5. texanus** (Ashmead)
   Lower part of mesopleurum usually with a long white stripe which anteriorly curves upward, but this stripe sometimes broken into two spots of variable size, one or both of the spots sometimes absent; notaulus sharp. 3
3. Hind coxa black and white; postpetiole black above, with a white apical band; orbital white mark complete . . . . **2. fortis** (Cresson)
   Hind coxa fulvous, with a variable amount of whitish, often fuscous at base; postpetiole fulvous, usually with a white apical band; orbital white mark interrupted, at least on upper part of hind orbit, sometimes almost entirely lacking . . . . **3. audax** (Cresson)

1. Baryceros candidus (Cresson), new combination

FIGURE 330,b

Mesostenus candidus Cresson, 1878, Canadian Ent., vol. 10, p. 206; ♂. Type: ♂, New York (Philadelphia).

Crypturus albomaculatus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 414; ♂. Type: ♂, Michigan (Washington).

Crypturopsis abdominalis Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 28; ♀. Name preoccupied in *Baryceros* by Cresson (*Mesostenus*) *Baryceros abdominalis* (Cresson) 1873, new combination. New synonymy.

Christolia dumetorum Townes, 1944, Mem. Amer. Ent. Soc., vol. 11, p. 271. New name for *Crypturopsis abdominalis*.

Front wing of male 6.5 to 8 mm. long, of female 5.7 to 10 mm. long. Structurally similar to *B. audax* except that punctation is a little coarser and closer, wrinkling on thorax less extensive, hairs on basal half of third tergite of female denser (most of these separated by about their length), and ovipositor tip a little more slender.

Male: Colored like the male of *B. audax audax* except as mentioned in key, and except that the hind femur has an average of less fuscous.

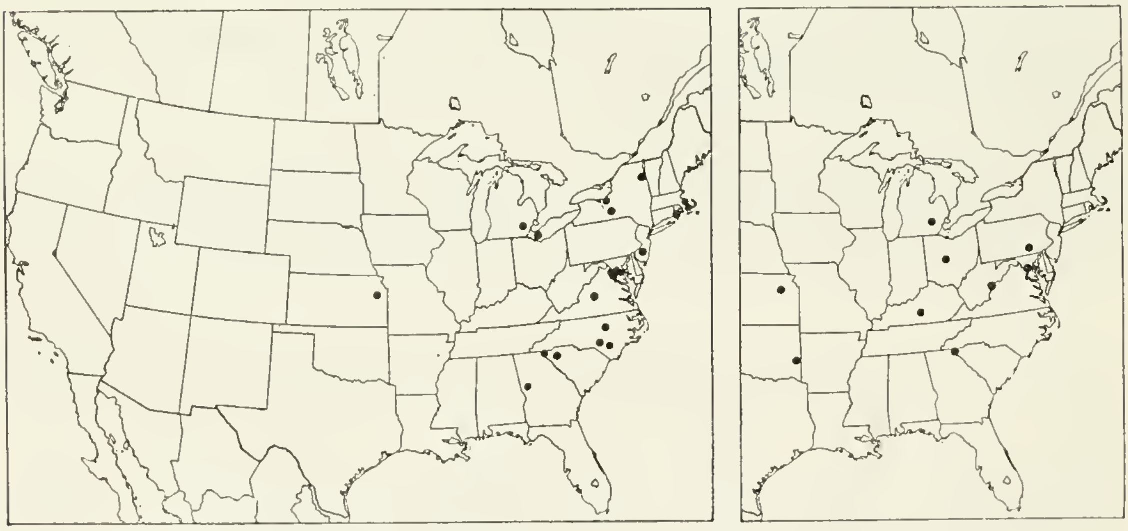
Female: Black. Head and thorax marked with white as in figure 330,b; abdomen uniformly reddish fulvous except that apex of petiole is sometimes a little paler; palpi stramineous; flagellum with a white band that is interrupted below; front and middle coxae and trochanters whitish, the coxae with a small apical external fuscous spot, their bases blackish; hind coxa varied with fulvous, whitish, and fuscous as in figure 330,b; hind trochanters and legs beyond trochanters fulvous, the last segment of all tarsi and area at articulation of hind femur with trochanter reddish brown. The white spots covering propodeal tubercles are smaller than in *B. audax* and *B. fortis*, but larger than in *B. texanus*.

Specimens (27♂, 36♀): From Florida; Georgia (Pine Mountain in Rabun Co. at 1,400 ft., and Zebulon); Kansas (Baldwin [City]); Maryland (Bowie and Takoma Park); Massachusetts (Duxbury and Woods Hole); Michigan (Ann Arbor); New Jersey (Brown Mills); New York (Essex Co., Ludlowville, and Wayne Co.); North Carolina (Clinton, Raleigh, and Southern Pines); Ohio (Put-in-Bay on South Bass Island); Rhode Island (Charlestown); South Carolina (Greenville); and Virginia (Arlington, Charlottesville, and Falls Church).

Collection dates are from mid-spring to mid-fall. A large portion of the specimens was taken in September and October. Unusually early and late dates are: April 14 at 1,400 ft. on Pine Mt., Rabun Co., Ga.; April 16 at Zebulon, Ga.; May 7 at Raleigh, N.C.; May 30 at Falls Church, Va.; and October 31 at Takoma Park, Md., and at Southern Pines, N.C.

We find the species in open, rather dry habitats, with deciduous trees and bushes.

This species occurs in the Carolinian fauna.



Figures 2, 3.—Localities: 2 (left), *Baryceros candidus;* 3 (right), *B. fortis.*

2. Baryceros fortis (Cresson), new combination

Figure 330,c

Mesostenus fortis Cresson, 1878, Canadian Ent., vol. 10, p. 206; ♀. Type: ♀, New York (Philadelphia).

Front wing of male 9.0 to 9.5 mm. long, of female 9 to 10 mm. long. Structure similar to that of *B. audax* except that punctation on mesopleurum and metapleurum is faintly finer and denser, wrinkling on thorax less extensive, and that propodeal tubercles are a little weaker.

Male: Colored as in the male of *B. audax audax* except that mesosternum is almost entirely white. The white orbital mark is sometimes almost complete.

Female: Head, thorax, abdomen, and hind coxa marked with white as in figure 330,c. Flagellum with a white band that is incomplete below; palpi stramineous; front and middle coxae and trochanters whitish, usually blackish at extreme base and sometimes with a small external apical fuscous spot; hind trochanters fulvous, the basal trochanter paler; legs beyond trochanters fulvous, the fifth segment of tarsi and area at articulation of hind femur with trochanter brownish fulvous. There is a pair of posterior median white marks on the mesosternum, which are nearly always absent in the female of *B. audax audax*.

Specimens: ♀, Pinnacle Peak, Rabun Co., Ga., Aug. 20, 1913 (Ithaca). ♀, Topeka, Kans., August 16, Popenoe (Washington). ♀, Green Co., Ky., Aug. 18, 1944 (Dreisbach). ♀, Bowie, Md., Aug. 27, 1944, H. and M. Townes (Townes). ♀, Plummers Island, Md., Sept. 12, 1912, H. S. Barber (Washington). ♂, Ann Arbor, Mich., August 1958, H. and M. Townes (Townes). ♀, Delaware Co., Ohio, August 1926, D. J. and J. N. Knull (Columbus). ♀, Page, Okla., June 24, 1934, A. E. Pritchard (Ottawa). ♂, Highspire, Pa., July 30, 1910, W. S. Fisher (Washington). ♀, Cheat Mt., 2,000 ft. in Randolph Co., W. Va., August 23 (Pittsburgh).

This species occurs in the Carolinian fauna.

3. Baryceros audax (Cresson), new combination

Front wing of male 6.3 to 8 mm. long, of female 7.5 to 10.5 mm. long; notaulus sharp; upper third of mesopleurum with strong, curved, parallel wrinkles; punctures of mesopleurum rather small, shallow, separated by about 1.5 their diameter; punctures of metapleurum coarse, moderately dense, somewhat confluent with rugosity; hairs on third tergite separated by about 2.5 their length on basal half of tergite, separated by about their length on apical half.

There are northern and southern subspecies, differing in the extent of white markings on the head and thorax, as keyed and described below:

1. Hind orbit of female white except on its upper 0.25±; lower half of mesopleurum with a curved white stripe, which is sometimes broken into two white spots; range: Austroriparian and Carolinian faunas.
   3a. audax audax (Cresson)

   Hind orbit of female black except sometimes for a white stripe that extends less than two-thirds its length; lower half of mesopleurum with two disconnected white spots, with one spot, or entirely black; range: Alleghanian fauna.
   3b. audax saundersi (Cresson)

3a. Baryceros audax audax (Cresson), new combination

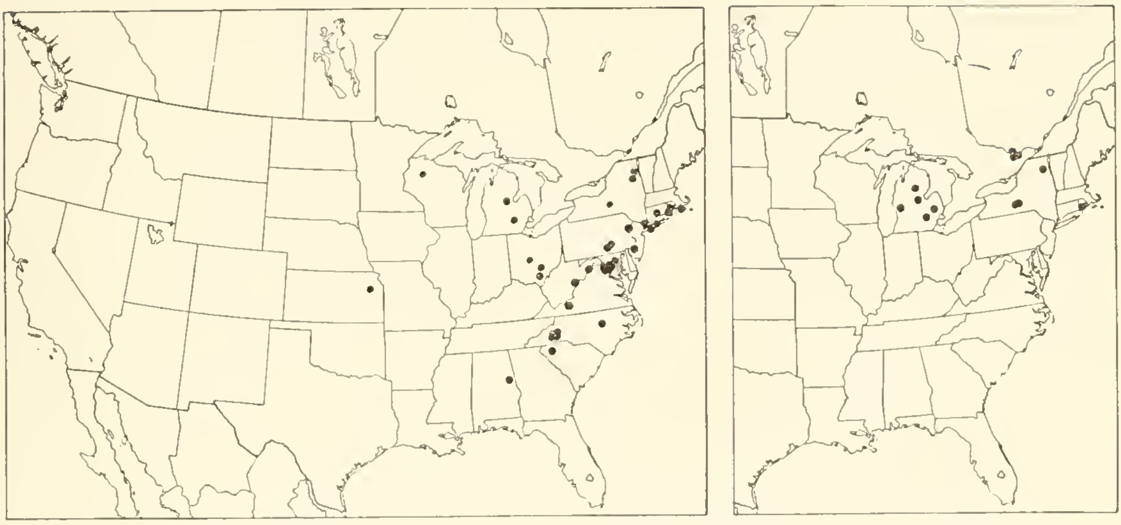
Mesostenus audax Cresson, 1878, Canadian Ent., vol. 10, p. 207; ♀. Type: ♀, Georgia (Philadelphia).

Mesostenus exaptus Cresson, 1878, Canadian Ent., vol. 10, p. 208; ♀. Type: ♀, Massachusetts (Philadelphia).

Male: Black. Head and thorax marked with white as in female of *B. fortis* (fig. 330,c), except that face and clypeus are entirely white and flagellum is entirely black; front and middle coxae and trochanters white, the coxae blackish at extreme base and often with a small external apical fuscous spot; front and middle legs beyond trochanters fulvous, the last segment of front tarsus brownish and last two or three segments of middle tarsus fuscous or infuscate; hind coxa blackish, white basally and apically above, thus colored like hind coxa of female of *B. fortis;* hind first trochanter white, fuscous above on base and apex; hind second trochanter black, partly whitish at base; hind femur fulvous, fuscous apically and basally above, the amount of fuscous variable; hind tibia blackish, with a subbasal, indistinctly bounded, fuscofulvous area of variable development; hind tarsus white, the base of basitarsus sometimes infuscate, and apical 0.1 to 0.4 of last segment fuscous; abdominal tergites each with a wide apical white band, the first segment also with a whitish area of variable extent that is continued forward under spiracle to petiole; genitalia white.

Female: Black. Head and body marked with whitish and fulvous as in *B. fortis* (fig. 330,c), except that first abdominal segment lacks the fuscous mark. Mesoscutum with a median pair of white stripes, the curved white line on lower part of mesopleurum sometimes broken into two spots; flagellum with a white band; palpi whitish; front and middle coxae and trochanters fulvous with a variable amount of whitish; hind coxa mostly fulvous, basally with a variable amount of fuscous, and with a variable amount of whitish markings; hind trochanters fulvous; legs beyond trochanters fulvous, the last segment of all tarsi and area at articulation of hind femur with trochanter fulvous; postpetiole fulvous, with a white apical band.

Specimens (42♂, 74♀): From Alabama (Pyriton in Clay Co.); Connecticut (Brook State Park at Wallingford); Kansas (Douglas Co. at 900 ft.); Maryland (Baltimore, Cabin John, Plummers Island, and Takoma Park); Massachusetts (Martha's Vineyard); Michigan (Ann Arbor and Midland Co.); New Jersey (Lucaston); New York (Farmingdale, McLean Bogs Reserve in Tompkins Co., top of Mount Marcy, New Russia, Nyack, and Yaphank); North Carolina (valley of Black Mts., Crabtree Meadows in Yancey Co. at 3,600 ft., Hamrick, Mount Mitchell, and Raleigh); Ohio (Columbus, Hocking Co., and Jackson Co.,); Pennsylvania (Carlisle Junction, Delaware Water



FIGURES 4, 5.—Localities: 4 (left), *Baryceros audax audax;* 5 (right), *B. a. saundersi.*

Gap, and Inglenook in Dauphin Co.); Rhode Island (Kingston and Westerly); South Carolina (Greenville); Virginia (Arlington, Falls Church, Great Falls, and Mountain Lake in Giles Co.); West Virginia (Cheat Mt. in Randolph Co. at 2,000 ft. and Lost River State Park in Hardy Co.); and Wisconsin (Sawyer Co.).

Collection dates are mostly from August 1 to October 13. Those outside of this range are: July 18 to 22 at Midland, Mich.; July 22 and 27 at McLean Reserve, Tompkins Co., N.Y.; July 27 at Ann Arbor, Mich., and at Westerly, R.I.; October 22 and 24 at Arlington, Va.; and October 30 at Plummers Island, Md.

This subspecies occurs in the Austroriparian and Carolinian faunas. It is adult from late summer to mid-fall.

3b. Baryceros audax saundersi (Cresson), new combination, new status

FIGURE 330,d

Mesostenus Saundersi Cresson, 1878, Canadian Ent., vol. 10, p. 208; ♀. Type: ♀, "Canada West" (Philadelphia).

Mesostenus armatus Provancher, 1886. Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 76. New synonymy. Type: ♀, Ottawa, Ont. (Ottawa).

Male: Similar to color of male of *B. audax audax* except that mesopleurum has a pair of white spots on its lower half instead of either a curved stripe or a pair of elongate spots.

Female: Colored like the female of *B. audax audax* but with less extensive white markings, the white spots on head and thorax being usually very small. See figure 330,d.

Specimens: ♂, Ann Arbor, Mich., August 1958, H. and M. Townes (Townes). 2♂, 4♀, Midland Co., Mich., Aug. 22, 1944, Aug. 22, 1957, August 1944, Sept. 14, 1956, and Sept. 22, 1958, R. and K.

Dreisbach (Dreisbach). 2♀, Muskegon Co., Mich., Aug. 2, 1944, R. R. Dreisbach (Dreisbach). ♂, Oakland Co., Mich., July 19, 1946, R. R. Dreisbach (Townes). ♀, Roscommon Co., Mich., Oct. 10, 1945, R. R. Dreisbach (Dreisbach). ♀, Ithaca, N.Y., Aug. 27, 1896 (Ithaca). ♀, Mount Whiteface, 4,000 ft., N.Y., Aug. 11, 1950, H. Dietrich (Ithaca). ♀, Ringwood, near Ithaca, N.Y., Oct. 2, 1938 (Townes). ♀, "Cedar Springs," Ohio, Oct. 8, 1935, J. N. Knull (Columbus). ♀, Rockcliffe, Ont., Sept. 18, 1940, G. S. Walley (Ottawa). ♂, Aylmer, Que., July 30, 1926 (Ottawa). 2♀, Queen's Park, Aylmer, Que., Aug. 27, 1924 and Sept. 3, 1926, C. B. Hutchings and A. R. Graham (Ottawa). ♀, Alton, R. I., Sept. 18, 1937, H. Townes (Townes).

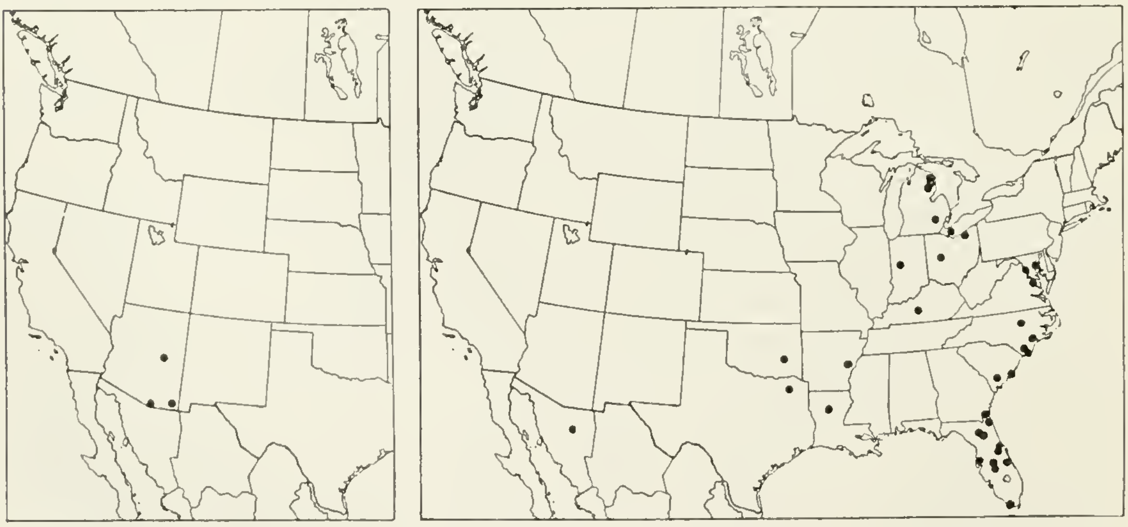
This subspecies occurs in the Alleghanian fauna. It is adult from late summer to mid-fall.

4. Baryceros halli, new species

FIGURE 330,e

Male: Front wing 8.5 to 9 mm. long. Structurally similar to *B. audax* except that punctures are coarser and stronger and that the wrinkling on the thorax is much weaker. Punctures on mesopleurum and metapleurum separated by about 0.5 their diameter.

Black. Head and body with ivory markings as in figure 330,e; mesoscutum with two whitish stripes; small oval dorsobasal spot on hind coxa and basal spot or areas on front and middle coxae, ivory; palpi light brown; coxae fulvous except for ivory markings, the front coxa fuscous basally; trochanters, femora, and front and middle tibiae fulvous; front and middle tarsi pale fulvous, the last segment of front tarsus and last three segments of middle tarsus, brown; basal 0.1 of hind tibia fulvous, the next 0.2 fuscofulvous, the apical



FIGURES 6, 7.—Localities: 6 (left), *Baryceros halli;* 7 (right), *B. texanus.*

0.7 fuscous; hind tarsus white, the basal 0.25 of first segment and all of last segment blackish.

Female: Unknown.

Type: ♂, Cave Creek Canyon, Chiricahua Mts., Ariz., July 4–8, 1940, D. G. Hall (Washington, USNM 63748).

Paratypes: ♂, Nogales, Ariz., July 15, 1903, Oslar (Ithaca). 3♂, Parker Creek, Sierra Ancha, Ariz., May 7, 1947, H. and M. Townes (Townes).

5. Baryceros texanus (Ashmead), new combination

FIGURE 330,f

Crypturus texanus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 413; ♂. Type: ♂, Texas (Washington).

Crypturus Dyari Ashmead, 1897, Canadian Ent., vol. 29, p. 113; ♂, ♀. Lectotype (hereby designated): ♀ (labeled lectotype by Townes), [Florida] (Washington).

Front wing of male 6 to 8 mm. long, of female 6 to 8.5 mm. long; notaulus not distinct but its position shown by a strongly punctato-rugose area; upper third of mesopleurum with moderately strong, curved, parallel wrinkles; punctures of mesopleurum rather small, sharp, separated by about 1.2 their diameter; metapleurum strongly reticulately wrinkled; propodeal tubercles blunt conical; hairs on third tergite of female sparse, their sockets separated by about 2.5 their length, denser laterally.

Male: Black. Head and body marked with white as in female (fig. 330,f), except that face and clypeus are entirely white; front and middle coxae and trochanters whitish, often varied with fulvous; front and middle legs beyond trochanters fulvous, the apex of their femora and basal 0.2 of tibiae yellowish white, the apical two segments of front tarsus and apical three segments of middle tarsus fuscous; hind coxa fulvous, on upper side whitish toward base and with a brownish tinge toward apex; hind trochanters blackish; narrow apex of first trochanter and broad base of second trochanter whitish; hind femur fulvous, more or less infuscate but paler below, and its apical 0.15± always light fulvous; hind tibia and tarsus blackish, the basal 0.2± of hind tibia pale fulvous.

Female: Black. Head and body marked with ivory white as in figure 330,f; palpi stramineous; mesoscutum with a pair of whitish stripes; flagellum with a white band; front and middle coxae and trochanters whitish with fulvous tinges; hind coxa fulvous, whitish above toward base; hind trochanters fulvous, the second trochanter very pale; legs beyond trochanters fulvous, the last two segments of tarsi and area at articulation of hind femur and trochanter, brown;

first abdominal segment pale fulvous, its apex white and with a subapical fuscous area above.

Specimens (68♂, 16♀): From Arkansas (Arkansas River in Arkansas Co.); Florida (Gainesville, Highlands Hammock State Park, Indian River Co., Interlachen, Jacksonville, Orlando, Ormond, Paradise Key in Everglades National Park, Stock Island, Tarpon Springs, and Wauchula); Georgia (Chesser's Island in Okefenokee Swamp); Indiana (Tippecanoe Co.); Kentucky (Green Co.); Louisiana (Winfield); Maryland (Big Island in Rhode River); Michigan (Alcona Co., Alpena Co., Ann Arbor, and Ogemaw Co.); North Carolina (Edgecombe Co., Long Beach, Raleigh, and Wallace); Ohio (Cleveland, Delaware Co., and Put-in-Bay on South Bass Island); Oklahoma (Wilburton); South Carolina (McClellanville and Yemassee); Tennessee; Texas (Hopkins Co.); Virginia (Dunn Loring and Westmoreland State Park in Westmoreland Co.); and Mexico (San Bernardo in Sonora).

Collection dates range from late spring to early fall. Early and late dates of interest are: March 21 at Tarpon Springs, Fla.; April 7 at Interlachen, Fla.; May 13 at McClellanville, S.C.; June 8 on the Arkansas River, Arkansas Co., Ark.; June 13 at Wilburton, Okla.; June 21 at Ann Arbor, Mich.; September 11 at Dunn Loring, Va.; September 12 in Wake Co., N.C.; October 22 in Hopkins Co., Tex.; and November 15 at San Bernardo, Sonora, Mexico.

The types of the synonym *Crypturus dyari* were reared from *Alarodia slossoniae.*

This species occurs in the Carolinian and Austroriparian faunas. It is adult from late spring to early fall.

2. Subtribe Mesostenina

Clypeus various, usually moderately narrow and moderately to strongly convex, its apical margin usually more or less convex and often with a more or less distinct median apical tooth or lobe; mandible about 1.5 to 3.5 as long as it is wide at the middle, its two teeth of equal length or the lower tooth shorter, rarely the mandible more than 4.0 as long as its width at the middle and its lower tooth very small or obsolescent (as in *Compsocryptus buccatus*); flagellum various, usually slender; last flagellar segment of female usually tapered to a simple rounded point but sometimes with a somewhat flattened apical sensory area; thorax various, usually of moderate proportions; propodeum often with strong sublateral teeth or spines (the other subtribes never have these well developed); propodeal spiracle round to elongate; front tibia sometimes more or less inflated but usually not; fourth tarsal segment of female usually more or less bilobed apically, always bilobed when with a group of strong apical bristles beneath (the usual condition); areolet very small to large, when small sometimes open at apex, usually pentagonal or almost square but sometimes oblong (especially when reduced in size); first tergite usually rather strongly expanded apically, its spiracle varying from just behind the middle to far behind the middle; ovipositor various, usually weakly compressed with a weakly sagittate tip, rarely the tip of lower valve enclosing or partially enclosing the upper valve (as in *Dotocryptus*, *Amauromorpha*, and *Kriegeria*), the upper valve without transverse ridges and rarely with teeth between its nodus and apex (in these exceptions the ovipositor tip is rather strongly compressed).

This is by far the largest subtribe, and the one most diverse in structure, hosts, and biological characters. Its distribution is worldwide.

Key to the Nearctic genera of Mesostenina

(Includes also the two Nearctic genera of Baryceratina.)

1. Frons with a strong sublateral carina extending upward from outer edge of antennal socket (fig. 307,a); areolet moderately small, approximately rectangular, its front side longer than its hind side (fig. 307,a). Subtribe Baryceratina, in part . . . . **Whymperia** (p. 22)
   Frons without a strong sublateral carina; areolet various 2
2. Areolet medium or large, always closed, both its height and width greater than six times the width of the bordering veins 3
   Areolet small, often open apically, either its width or its height less than five times the width of the bordering veins. (*Hemisphragia*, which has an areolet of almost intermediate size, is included here. The single Nearctic species is small, slender, and lacks the brachiella vein (fig. 317,a)) . . . 18
3. Mesoscutum rather weakly convex, broad; notaulus usually absent or short (except in *Hidryta*), seldom extending beyond middle of mesoscutum; thorax short and first abdominal segment elongate, the latter more than half as long as thorax; tergite 2 usually polished and not conspicuously punctate. See habitus figures 315,b and 316,a,b 4
   Mesoscutum more strongly convex, usually narrower; notaulus usually extending beyond middle of mesoscutum (but not in *Compsocryptus*, *Lanugo*, or *Reptatrix*); second tergite often mat, or evidently punctate, or both mat and punctate (but not in *Joppidium*) 6
4. Prepectal carina ending near middle of hind margin of pronotum (fig. 316,b); nervulus at or distad of basal vein; prepectus usually with a short, vertical carina opposite lower corner of pronotum; epomia usually strong; ovipositor tip sagittate . . . . **17. Trychosis** (p. 333)
   Prepectal carina reaching subtegular ridge (figs. 315,b and 316,a); nervulus at or basad of basal vein; prepectus without a vertical carina opposite lower corner of pronotum; epomia usually weak or absent 5
5. Sides of areolet strongly convergent (fig. 315,b); notaulus sharp, reaching at least to center of mesoscutum; ovipositor tip rather abruptly tapered from a distinct nodus; clypeus moderately small . . . . **15. Hidryta** (p. 318)
   Sides of areolet subparallel (fig. 316,a); notaulus absent or weak and short, not reaching center of mesoscutum; ovipositor tip gradually tapered from an indistinct nodus; clypeus large . . . . **16. Idiolispa** (p. 322)

6. Propodeum with lateral longitudinal carina distinct, more or less complete (fig. 308,a); pubescence of head and thorax very dense; apical margin of clypeus truncate or somewhat concave, without a median tooth or lobe; nervellus broken near the middle . . . . **1. Apsilops** (p. 37)
   Propodeum without lateral longitudinal carina; pubescence of head and thorax varying from sparse to dense 7
7. Middle part of mediella vein rather weakly to strongly arched (figs. 308,a to 312,a); propodeal spiracle round to short elliptic; tergite 7 often with a large median white spot 8
   Middle part of mediella almost straight or weakly arched (figs. 312,b to 315,a); propodeal spiracle short elliptic to long and slitlike; tergite 7 without a median white spot in any of the Nearctic species 13
8. Sides of areolet parallel or weakly convergent (more strongly convergent in *Agrothereutes pallipennis* and *A. alutarius*), and the base of first tergite with a lateral subtriangular projection opposite insertion of extensor tendon (the projection weak in male, stronger in female); flagellum of male without a white band 9
   Sides of areolet definitely convergent and/or the base of first tergite without a lateral subtriangular projection opposite insertion of extensor tendon; flagellum of male sometimes with a white band 10
9. Mesoscutum polished or subpolished, rather strongly punctate, sometimes mat near notauli and margins or mat except for median part of its three lobes; apical propodeal carina nearly always absent medially, just mesad of the sublateral crest turned strongly forward; hind tibia often with a whitish basal band . . . . **2. Agrothereutes** (p. 42)
   Mesoscutum mat, more or less punctate; apical propodeal carina complete medially, the median portion turned only moderately forward; hind tibia without a basal whitish band . . . . **3. Gambrus** (p. 70)
10. Clypeus weakly to moderately convex, its apical margin usually with a more or less distinct median point or lobe; sides of areolet subparallel or convergent; base of first abdominal tergite usually without a lateral triangular projection opposite insertion of extensor tendon 11
    Clypeus strongly convex (often pyramidal in profile), without a median apical point or lobe; sides of areolet strongly convergent; base of first abdominal tergite often with a lateral triangular projection opposite insertion of extensor tendon 12
11. Dorsolateral carina of first tergite usually distinct basad of spiracle; second recurrent vein nearly straight or more or less sinuate (fig. 310,b), vertical or somewhat inclivous; postpetiole rather weakly convex above; ovipositor strongly compressed . . . . **5. Aritranis** (p. 98)
    Dorsolateral carina of first tergite absent or indistinct just basad of spiracle; second recurrent vein strongly sinuate and reclivous (fig. 311,a); postpetiole strongly convex above; ovipositor moderately compressed.
    6. Pycnocryptus (p. 126)
12. Second tergite mat and with moderately dense, medium-sized punctures; mediella vein strongly arched; flagellum of male almost always with a white band; base of first tergite with a subtriangular lateral projection at level of insertion of extensor tendon, the projection weak in male, stronger in female . . . . **7. Ischnus** (p. 131)
    Second tergite mat, not distinctly punctate; mediella vein rather weakly to rather strongly arched; flagellum of male without a white band; base of first tergite often without a lateral projection at level of insertion of extensor tendon . . . . **8. Habrocryptoides** (p. 165)

13. Postpetiole slender, the part behind the spiracles 1.5 to 2.0 as long as wide; petiole terete, without a ventrolateral longitudinal carina; nervulus at or distad of basal vein; subapical part of female flagellum widened; apical part of axillus vein (the short vein in anal part of hind wing) at least as far from anal margin of wing as from submediella; wings of all Nearctic species black . . . . **14. Joppidium** (p. 306)

Postpetiole usually stouter, the part behind spiracles usually 1.2 to 1.5 as long as wide in males, 0.7 to 1.2 as long as wide in females; petiole usually prismatic, with a ventrolateral longitudinal carina; nervulus at or basad of basal vein; subapical part of female flagellum not widened except in *Reptatrix* and in some species of *Compsocryptus;* apical part of axillus vein closer to anal margin of wing than to submediella except in *Compsocryptus* and in some Neotropic species of *Trachysphyrus;* wings variously colored, often subhyaline or banded, sometimes black 14

14. Notaulus long, extending beyond center of mesoscutum (except in *Trachysphyrus crassifemur,* which species differs from those in second half of couplet in having a pitlike depression on frons dorsolaterad of antennal socket); wings usually hyaline or subhyaline but sometimes darker, banded only in *Trachysphyrus fasciatus* (fig. 339) 15

Notaulus short, not reaching center of mesoscutum; wings usually dark brown or banded with brown or black 16

15. Punctures on tergite 2 small, usually weak, and in female usually sparse; propodeal spiracle short elliptic to elongate; thorax and abdomen not variegated with white, red, and black in any Nearctic species.
9. Trachysphyrus (p. 177)

Punctures on tergite 2 coarse, strong, and rather dense; propodeal spiracle short elliptic; thorax and abdomen variegated with white, red, and black.
10. Chromocryptus (p. 256)

16. Apical part of axillus vein (the short vein in anal part of hind wing) equidistant between anal margin of wing and submediella, or closer to submediella (fig. 314,b); front side of areolet usually about as long as mesal side; ovipositor rather long, upcurved . . **13. Compsocryptus** (p. 278)

Apical part of axillus vein closer to anal margin of wing than to submediella; front side of areolet shorter than mesal side; ovipositor rather short, straight 17

17. Clypeus about 2.0 as wide as long; hairs on thorax and on tergite 2 moderately sparse to dense in male, dense to very dense in female; subapical part of female flagellum not widened, terete . . . . **11. Lanugo** (p. 259)

Clypeus about 2.8 as wide as long; hairs on thorax and on tergite 2 rather sparse in both sexes; subapical part of female flagellum a little widened, flattened below . . . . **12. Reptatrix** (p. 276)

18. Frons with a median horn or pair of horns (best seen from above) . . . 19

Frons unarmed, but sometimes with a median longitudinal carina or ridge . 23

19. Apex of first abdominal sternite distad of spiracle; petiole rounded ventrolaterally, without a longitudinal ventrolateral carina 20

Apex of first abdominal sternite opposite or basad of spiracle; petiole angled ventrolaterally and with a more or less distinct ventrolateral longitudinal carina, at least with a ventrolateral carina or flange on apical part of petiole 21

20. Second discoidal cell pointed or very narrow at base (fig. 319,b); areolet not wider than high (fig. 319,b) . . . . **23. Polycyrtidea** (p. 405)

Second discoidal cell broadly obliquely truncate at base (fig. 322,b); areolet wider than high (fig. 322,b) . . . . **29. Polycyrtus** (p. 459)

21. Frons with a median pair of horns that are placed side by side, the horns either entirely separate or on a common base (see from above); areolet about 1.5 as wide as high . . . . **25. Cryptanura** (p. 426)
Frons with a single median horn, the horn sometimes with a dorsal tine . . . 22

22. Second tergite with close, strong punctures; petiole bordered ventrolaterally by a strong carina; areolet 0.7 to 1.0 as wide as high. **24. Listrognathus** (p. 407)
Second tergite almost impunctate; petiole bordered ventrolaterally by a weak, obsolescent carina; areolet about 1.3 as wide as high. **26. Chamula** (p. 430)

23. Mediella vein weakly arched, near its apical 0.4 almost straight 24
Mediella vein strongly arched, near its apical 0.4 strongly curved . . . 25

24. Areolet not wider than high (fig. 321,b); median part of apical transverse carina of propodeum present, approximately in line with or a little basad of the sublateral crests; ovipositor sheath about as long as first tergite. **27. Camera** (p. 432)
Areolet wider than high (fig. 322,a) except in *M. eisenii;* median part of apical transverse carina of propodeum either absent or much basad of the sublateral crests; ovipositor sheath longer than first tergite. **28. Mesostenus** (p. 434)

25. Brachiella vein lacking; body form slender; areolet only moderately small. **18. Hemisphragia** (p. 378)
Brachiella vein present 26

26. Apical transverse carina of propodeum complete and strong; propodeum with longitudinal as well as transverse carinae (fig. 318,b); ovipositor sheath about as long as first tergite . . . . **21. Pachysomoides** (p. 398)
Apical transverse carina of propodeum incomplete, absent at least at center; propodeum without longitudinal carinae 27

27. Base of second discoidal cell pointed or strongly narrowed (fig. 319,a); ovipositor sheath a little shorter than first tergite . . **22. Acerastes** (p. 403)
Base of second discoidal cell broadly truncate; ovipositor sheath longer than first tergite 28

28. Apical part of axillus vein (the short vein in anal part of hind wing) diverging from anal margin of wing (fig. 307,b); nervulus at or a little distad of basal vein; mesoscutum broad and rather flat; subapical segments of female flagellum wider than long. Subtribe Baryceratina, in part. **Baryceros** (p. 23)
Apical part of axillus converging to anal margin of wing; nervulus at or basad of basal vein; mesoscutum narrower and more arched; subapical segments of female flagellum longer than wide 29

29. Base of first tergite with a lateral subtriangular point or swelling opposite attachment of extensor tendon (usually strong and sharp in female, weak and blunt in male); second tergite of female with dense hairs. **19. Diapetimorpha** (p. 380)
Base of first tergite entirely without a lateral projection opposite attachment of extensor muscle 30

30. Apex of clypeus without a distinct median point (fig. 318,a) or when with a median point it is not truncate; second tergite of female sparsely punctate; first tergite of moderate length, its spiracle well behind the middle. **20. Lymeon** (p. 393)
Apex of clypeus truncate and with a small median point (fig. 310,a); second tergite of female rather densely punctate; first tergite short and stout, its spiracle only a little behind the middle . . . . . . **4. Mallochia** (p. 93)

1. Genus Apsilops

Figure 308,a

Apsilops Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 182. Type: *Cryptus hirtifrons* Ashmead; included by Ashmead, 1896.

Heterotypus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 183. Type: *Ichneumon cinctorius* Fabricius; designated by Townes, Townes, and Gupta, 1961.

Dapanus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 183. Type: *Ichneumon cinctorius* Fabricius; designated by Ashmead, 1900.

Sobas Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 187. Name preoccupied. Type: *Ichneumon cinctorius* Fabricius; included by Schmiedeknecht, 1890.

Trichocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 520. Type: *Ichneumon cinctorius* Fabricius; monobasic.

Neostricklandia Viereck, 1925, Canadian Ent., vol. 57, p. 75. Type: *Neostricklandia sericata* Viereck; original designation.

Trichestema Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 9. Type: (*Trichestema helcostizoides* Cushman) = *sericata* (Viereck); original designation.

Front wing 3.6 to 8.7 mm. long; hairs of head and body exceptionally dense; thorax of moderate proportions or rather elongate; frons unarmed; clypeus of moderate size, strongly convex, its apical margin broadly truncate or weakly concave; mesoscutum moderately long and convex, subpolished but with very fine, dense, setiferous punctures; notaulus long, strong, deeply impressed, surpassing center of mesoscutum; epomia absent or short and weak; prepectal carina ending a little above center of hind margin of pronotum; posterior mesosternal carina usually interrupted in front of each middle coxa but in the species *scotina* complete; propodeum more or less elongate and with more or less distinct dorsal and posterior faces; transverse, lateral longitudinal, and median longitudinal carinae of propodeum distinct and more or less complete, the basal transverse carina obsolescent in the species *sericata*; sublateral crests of apical transverse carina of propodeum strong; areola defined by carinae laterally; propodeal spiracle subcircular to elongate; areolet pentagonal or subrectangular, the width of its front side variable; ramellus short or absent; nervulus at or a little basad of basal vein; nervellus broken below, at, or a little above the middle; axillus near anal margin; first abdominal segment rather short and stout, without a basolateral tooth, rather gradually expanded apically, its spiracle somewhat beyond the middle, its dorsolateral and ventrolateral carinae strong and complete, its median dorsal carinae strong to distad of its spiracle; second tergite subpolished, with dense or very dense, usually rather weak punctures; tergite 7 often marked with white; ovipositor sheath about 0.4 as long as front wing; ovipositor compressed, the teeth on its ventral valve only a little oblique, its upper valve sometimes serrate between nodus and apex.

Apsilops contains only seven known species, the European *Ichneumon cinctorius* Fabricius, 1775, and *Trichocryptus aquaticus* Thomson, 1874, the Oriental *Cryptus scotinus* Tosquinet, 1903, the three Nearctic species described below, and a seventh species, presumably from the United States, which is represented by a male in Washington labeled only "Collection C. V. Riley." This specimen is unique in the genus in having the clypeus and the front and middle coxae white. Its general appearance suggests less aquatic habits than other species. The name *aquatica* has not previously been referred to *Apsilops* (new combination). We have not seen specimens but place it from Thomson's description.

Adults of *Apsilops* occur on emergent or floating aquatic vegetation in lakes and marshes, or among bordering grasses and sedges. They parasitize aquatic or subaquatic Lepidoptera.

Key to the Nearctic species of Apsilops

1. Seventh tergite with a white spot; hind tibia black; abdomen black except for the apical white spot; body rather slender . . . . **1. hirtifrons** (Ashmead)
   Seventh tergite without a white spot; hind tibia fulvous to dark brown; abdomen often partly or mostly ferruginous; body stouter 2
2. Propodeal spiracle subcircular to elongate oval; upper face of propodeum moderately convex; fourth and fifth tergites of male partly or entirely ferruginous, of female entirely ferruginous . . . . . **2. bicolor** (Cushman)
   Propodeal spiracle a long, narrow slit; upper face of propodeum almost flat in female, more convex in male; fourth and fifth tergites of both sexes entirely fuscous . . . . **3. sericata** (Viereck)

1. Apsilops hirtifrons (Ashmead)

Cryptus hirtifrons Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 411; ♂. Type: ♂, Texas (Washington).

Front wing of male 3.6 to 5.2 mm. long, of female 4.5 to 5.8 mm. long; body moderately slender, not depressed, the first abdominal segment slender; hairs on thorax moderately dense; posterior mesosternal carina widely interrupted in front of each middle coxa; propodeum moderately convex above; areola of male about 2.0 as long as wide, of female about 1.1 as long as wide; median longitudinal carinae of propodeum strong to its base; propodeal spiracle subcircular; intercubiti approximately parallel; ovipositor rather slender, about 4.5 as long from nodus to apex as it is deep at nodus.

Black. Scutellum of female and sometimes of male with a white spot; seventh tergite with a white apical spot; median part of sixth tergite of female sometimes with a narrow white margin; coxae and femora fulvous, the apex of femora fuscous; trochanters infuscate; front and middle tibiae fuscous above, more or less fulvous below; hind tibiae and all tarsi black; wings weakly infuscate.

Specimens (8♂, 36♀): From Illinois (Havana); Kansas (Douglas Co.); Louisiana (Opelousas); Massachusetts (Wellesley); Michigan (Cass Co., Monroe, and Oakland Co.); Minnesota ("Bass Ponds" on Minnesota River, Lake Itasca, and Oakland Park near St. Paul); New York (Goodyear Lake near Milford Center, Northwest on Long Island, Orient, and Ringwood near Ithaca); Ohio (Columbus); Ontario (Iroquois, London, and Westboro); and Texas (Beaumont).

Adults have been collected from early spring to late fall, the earliest and latest dates being: March 23 in Oakland Park, St. Paul, Minn.; April 14 at Orient, Long Island, N.Y.; April 25 at the Bass Ponds in the Minnesota River, Minn.; October 11 at London, Ont.; October 13 in Douglas Co., Kans.; and December 2 at Beaumont, Tex.

Specimens with biological notes are as follows: ♀, on rice, Beaumont, Tex., Dec. 2, 1944. 3♀, leaf bases of *Typha*, Oct. 11, 1952, London, Ont. ♀, reared from *Nymphula*, Havana, Ill. 2♀, in house, Westboro, Ont., Nov. 25, 1944 and Jan. 31, 1944, G. S. Walley and C. G. McNey. ♀, under leaves, Oakland Park, St. Paul, Minn., Mar. 23, 1935, R. H. Daggy. 3♂, 2♀, walking on lily pads, Goodyear Lake, Milford Center, N.Y., Aug. 20 and 28, 1935, H. K. Townes.

We have found the species on lily pads of two different lakes, and once collected a short series at the edge of a small pond.

This species is widespread in the eastern half of the United States and southern Canada.

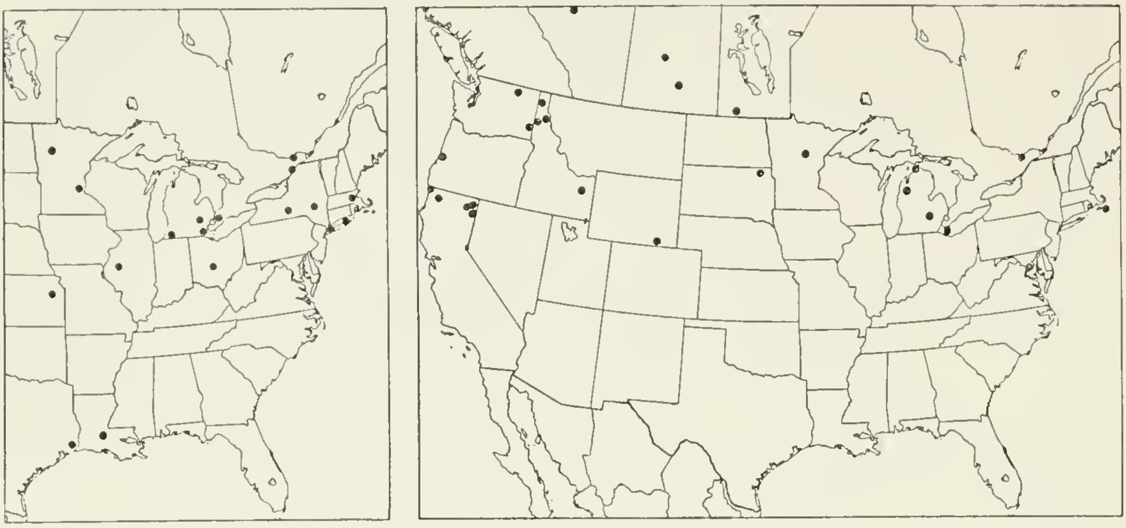
2. Apsilops bicolor (Cushman)

Trichocryptus bicolor Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 8; ♀. Type: ♀, Sprague, Wash. (Washington).

Trichocryptus atlanticus Cushman, 1930, Proc. U.S. Nat. Mus., vol. 76, art. 25, p. 3; ♀. Type: ♀, Bladensburg, Md. (Washington).

Front wing of male 4.4 to 6.8 mm. long, of female 4.8 to 7.6 mm. long; body of medium build, weakly depressed, the first abdominal segment moderately stout; hairs on thorax dense; posterior mesosternal carina widely interrupted in front of each middle coxa; propodeum moderately convex above; areola of male about 1.8 as long as wide, of female about 1.2 as long as wide; median longitudinal carinae of propodeum strong to the base; propodeal spiracle subcircular to elongate oval; intercubiti moderately convergent forward; ovipositor rather stout, about 3.3 as long from nodus to apex as it is deep at nodus.

Black. Palpi, basal 0.35± of female flagellum, and tegula brown; scutellum of male sometimes with a white spot, of female often with a white spot; coxae fulvous; trochanters fuscous brown; femora fulvous, the apex of hind femur of male usually narrowly infuscate, of female sometimes narrowly infuscate; tibiae fulvous to brown; tarsi



Figures 8, 9.—Localities: 8 (left), *Apsilops hirtifrons;* 9 (right), *A. bicolor.*

fulvous to fuscous, darker apically; wings weakly infuscate; first abdominal segment black, its apical 0.2 to 0.5 ferruginous; second and following tergites ferruginous, in the male often partly infuscate and sometimes mostly fuscous.

Specimens (16♂, 26♀): From Alberta (Wabamun); California (2 miles northwest of Blue Lake in Lassen Co., Crescent City, Davis Creek in Modoc Co., Hackamore in Modoc Co., and 6 miles south of Macdoel in Siskiyou Co.); Idaho (Chatcolet, Kellogg, Priest Lake, and 6 miles north of Roberts); Manitoba (Aweme and Churchill); Massachusetts (Nantucket); Michigan (Douglas Lake in Cheboygan Co., George Reserve in Livingston Co., and Wexford Co.); Minnesota (Big Trout Lake near Pine River); Ohio (Put-in-Bay on South Bass Island); Ontario (Ottawa); Oregon (Siltcoos Lake); Saskatchewan (Pike Lake and Regina); South Dakota (5 miles east of Britton); Washington (Bonaparte Lake in Okanagon Co. at 3,600 ft.); and Wyoming (Centennial at 8,000 ft.).

Dates of collection are distributed from late spring to late summer. The earliest and latest dates are: March 24 in Siskiyou Co., Calif.; May 24 at Pike Lake, Sask.; May 28 in the George Reserve, Livingston Co., Mich.; August 28 at Big Trout Lake, Pine River, Minn.; and September 10 at Nantucket, Mass. There is one reared specimen: ♂, from *Schoenobius melinellus*, Douglas Lake, Cheboygan Co., Mich., Aug. 4, 1936, W. C. Frohne.

We have collected the species only once, a female swept from a marshy meadow of coarse grass at Crescent City, Calif.

This species is transcontinental, in the Transition and Canadian zones.

3. Apsilops sericata (Viereck)

Neostricklandia sericata Viereck, 1925, Canadian Ent., vol. 57, p. 75; ♀. Type: ♀, Alberta (Ottawa).
Trichestema helcostizoides Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 9; ♀. Type: ♀, Bruce, S. Dak. (Washington).
BIOLOGY: Frohne, 1939, Trans. Amer. Micros. Soc., vol. 58, p. 234, 325, 347.

Front wing of male 6.2 to 8.7 mm. long, of female 6.9 to 8.5 mm. long; body stout, depressed, the first abdominal segment stout; hairs on thorax very dense; posterior mesosternal carina widely interrupted in front of each middle coxa; propodeum almost flat above; areola imperfectly defined, especially in female; median longitudinal carinae of propodeum indistinct or absent basad of the areola; propodeal spiracle elongate, a narrow slit; intercubiti strongly convergent forward; ovipositor of moderate stoutness, about 3.3 as long from nodus to apex as it is deep at nodus.

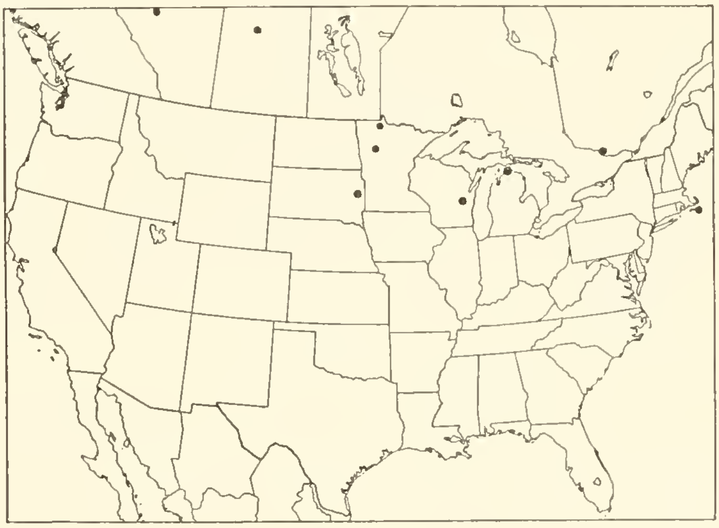


FIGURE 10.—Localities for *Apsilops sericata.*

Black. Palpi brown; scutellum of male rarely, of female nearly always with a white spot; coxae fulvous, or in males the upper side of hind coxa often fuscous; trochanters fuscous; femora fulvous, in the male the apex of front femur weakly infuscate, of middle femur rather narrowly fuscous, of hind femur broadly fuscous; front tibia fulvous; middle tibia brownish fulvous in male, fulvous in female, darkened at the base and apex; hind tibia brown in male, brownish fulvous in female, infuscate at base and apex; tarsi dark brown to black; wings faintly infuscate; abdomen of male black or with a brownish tinge; first abdominal segment of female black, second tergite of female ferruginous, usually with some infuscation; third tergite of female ferruginous basally, infuscate apically; fourth and following tergites of female blackish, often with a ferruginous tinge.

Specimens: 2♂, 7♀, Wabamun, Alta., July 31, 1929 and Aug. 2 and 14, 1929, E. H. Strickland (Ottawa). ♂, ♀, Wabamun, Alta., Aug. 2, 1938 and Aug. 14, 1929, E. H. Strickland (Townes). 2♂, Wabamun, Alta., July 13, 1939 and Aug. 2, 1938, E. H. Strickland (Edmonton). 4♂ 1♀, Nantucket, Mass., Sept. 10, 1929 and August 8, C. W. Johnson (Washington). ♀, reared from *Chilo forbesellus*, Cheboygan Co., Mich., July 26, 193–, N. Fishtail (Washington). ♂, reared from *Chilo forbesellus*, Douglas Lake, Cheboygan Co., Mich., Sept. 9, 1934 (Washington). ♀, Douglas Lake, Mich., July, C. H. Kennedy (Columbus). ♀, reared August 15 from material collected July 29, 1931, Marl Bay (on Douglas Lake), Cheboygan Co., Mich., Edith G. Kauffman (Ann Arbor). 2♂, Beltrami Co., Minn., Aug. 5, 1910 (St. Paul). ♂, Itasca Park, Minn., June 5, 1937, entomology class (St. Paul). ♀, Luskville, Que., Aug. 6, 1955, P. Taschereau (Ottawa). ♀, "Saint Anne's," Que., July 25, 1931 (Washington). 3♂, 10♀, Prince Albert National Park, Sask., May 26, 1939 and July 20 and 21, 1941, J. G. Rempel (Townes). ♂, 2♀, Prince Albert National Park, Sask., July 20, 1941, J. G. Rempel (Rempel). ♀, Oshkosh, Wis., Sept. 20, 1946, Helen Geiger (St. Paul).

This species ranges from the Atlantic Ocean to Alberta, mostly in the Canadian zone.

2. Genus Agrothereutes

FIGURES 308,b and 309,a

Agrothereutes Foerster, 1850, Arch. Naturg., vol. 16, art. 1, p. 71. Type: (*Pezomachus abbreviator* Gravenhorst) = *abbreviator* (Fabricius); designated by Viereck, 1914.

Spilocryptus Thomson, 1873, Opuscula entomologica, facs. 5, p. 501. Type: (*Spilocryptus zygaenarum* Thomson) = *solitarius* (Tschek); designated by Viereck, 1914.

Dayro Cameron, 1902, Ann. Mag. Nat. Hist., ser. 7, vol. 9, p. 209. Type: *Dayro pilosus* Cameron; monobasic.

Front wing 2.8 to 10.0 mm. long; wings in female of the species *abbreviator* often very short and the thorax correspondingly modified; thorax of moderate proportions (except in brachypterous specimens); frons unarmed; clypeus of moderate size, moderately to strongly convex, its apical margin broadly convex; mesoscutum moderately long and convex, usually entirely polished but in a few species mat along margins and notauli or mat with the median part of each of the three lobes polished, with moderate sized, rather dense, strong punctures; notaulus sharp, reaching a little beyond center of mesoscutum; epomia moderately strong to obsolescent; prepectal carina sometimes ending near middle of hind margin of pronotum but usually continued dorsad almost to subtegular ridge; propodeal spiracle circular or elliptic; propodeum of moderate shape; basal transverse carina of propodeum complete or medially obsolescent; apical transverse carina in the form of oblique sublateral crests (weak in male, rather strong in female), the carina absent medially except in some males and except in some eastern Palearctic species, in males with the carina complete medially it is weak in the middle, extends strongly basad from the sublateral crests and its median portion is transverse; areolet large, quadrate, its sides almost or quite parallel (except in the species *pallipennis* and *alutarius*); ramellus short or absent; nervulus at or basad of basal vein; mediella rather strongly arched; nervellus broken near its lower end; axillus close to anal margin; first tergite with a strong lateral subbasal tooth; spiracle of first tergite well beyond the middle; postpetiole rather strongly expanded; median longitudinal carinae of first tergite strong from base of tergite to disc of postpetiole, basad of the spiracle forming dorsolateral corner of the tergite; dorsolateral carina of first tergite strong distad of spiracle, weak or absent basad; ventrolateral carina of first tergite strong throughout; second tergite mat and with rather small punctures, these moderately sparse to very dense; tergite 7 usually marked with white; ovipositor sheath around 0.4 as long as front wing (except in brachypterous specimens); ovipositor moderately compressed, its tip more or less sagittate, varying from blunt to slender, its upper valve sometimes weakly serrate between nodus and apex.

Agrothereutes is a Holarctic genus, with nine species in North America and many more in Eurasia. Two of our species are Holarctic and probably more will eventually be shown to have this type of distribution. Most of them are northern. They parasitize sawfly and lepidopterous cocoons.

Females can be determined with relative certainty, particularly because of some helpful characters in the ovipositor tip. Most males can be correctly placed by the key and descriptions below, but the variation in coloration of males is often confusing or deceptive, and structural differences between them are minor and also variable. Some care and experience will be required for uniformly accurate determinations.

Keys to the Nearctic species of Agrothereutes

MALES

(The male of *montanus* is unknown.)

1. Wing veins white except for the subcosta and the stigma; temple with a prominent upper posterior swelling, at a place where the occipital carina curves sharply from its dorsal, more horizontal portion to its descending portion; intercubiti strongly convergent anteriorly, the areolet pentagonal; a small blackish species . . . . 4. **pallipennis,** new species
   Wing veins dark brown; temple without an upper posterior swelling, the occipital carina evenly curved; intercubiti parallel or weakly convergent anteriorly, the areolet quadrangular or subpentagonal 2

2. Second tergite and face both entirely black, except that apical margin of second tergite is narrowly ferruginous; mesoscutum largely mat and punctate, each of its three lobes often with a median polished and punctate stripe. **2. alutarius,** new species

Second tergite ferruginous, or if rarely black, then the face with white markings; mesoscutum polished and punctate, sometimes a little mat next to notauli 3

3. Metapleurum entirely or mostly ferruginous; seventh tergite fulvous, without a white spot; hind basitarsus entirely white, front wing 5.8 to 8.5 mm. long. **1. grandis,** new species

Metapleurum black, rarely ferruginous, in which case the hind basitarsus is not entirely white; seventh tergite usually with a white spot and usually more or less black; front wing 2.8 to 7.2 mm. long 4

4. Face white medially and laterally or entirely white, the white median mark (when discrete) joined to the clypeus, which is also white; mesopleurum just below tegula with longitudinal wrinkling . . . . . . **9. mandator** (Linnaeus)

Face black medially (often white laterally), or if sometimes with a median white spot this mark is not joined to the clypeus 5

5. Wrinkling on mesopleurum just below the tegula mostly longitudinal; clypeus and sides of face white; second segment of hind tarsus entirely white or sometimes partly brownish; hind coxa black or fuscous; propodeum entirely black . . . . **8. cimbcivorus** (Cushman)

Wrinkling on mesopleurum just below the tegula irregular or mostly vertical, rarely mostly longitudinal; coloration not entirely as described for *cimbcivorus* 6

6. Clypeus moderately convex, black, brown, fulvous, or sometimes white; face a little narrower, medially rather convex and weakly punctate; hind basitarsus with less than its apical 0.3 white . . . . **5. abbreviator** (Fabricius)

Clypeus weakly convex, always white; face a little wider, medially rather flat and more strongly punctate; hind basitarsus often with more than its apical 0.4 white 7

7. Face with its sides white; seventh tergite with a white spot; hind tibia with a basal whitish band; hind basitarsus with its apical 0.25 or more white; punctures on median part of face separated by about 0.4 their diameter. **6. lophyri** (Norton)

Face entirely black; seventh tergite without a white spot; hind tibia without a basal whitish band; hind basitarsus brown, its apex paler or whitish; punctures on median part of face crowded . . . . **7. neodiprionis** (Cushman)

FEMALES

1. Wings very short, useless for flight. **5. abbreviator** (Fabricius), some specimens

Wings of normal length 2

2. Profile of upper margin of ovipositor tip almost straight between the nodus and apex (figs. 327,g,h); basal ridges on tip of lower valve of ovipositor vertical (figs. 327,g,h); wrinkling of mesopleurum just below subtegular ridge with a tendency to be longitudinal rather than vertical or irregular; parasites of Clavellariidae 3

Profile of upper margin of ovipositor tip moderately convex between the nodus and apex (figs. 327,a-f); basal ridges on tip of lower valve of ovipositor oblique (figs. 327,a-f); wrinkling of mesopleurum just below subtegular ridge mostly vertical or irrigular; parasites of Lepidoptera and Symphyta 4

3. Middle coxa largely or entirely fuscous; third flagellar segment about 3.5 as long as wide; wrinkling of metapleurum usually without a longitudinal tendency; profile of upper edge of ovipositor a little more rounded at the nodus (fig. 327,g) . . . . **8. cimbcivorus** (Cushman)

Middle coxa entirely ferruginous; third flagellar segment about 5.3 as long as wide; wrinkling of metapleurum with a longitudinal tendency; profile of upper edge of ovipositor a little more angular at the nodus (fig. 327,h). **9. mandator** (Linnaeus)

4. Temple with a prominent upper posterior swelling, at a place where the occipital carina curves sharply from its dorsal, more horizontal, portion to its descending portion; intercubiti strongly convergent anteriorly, the areolet pentagonal; all coxae black . . . **4. pallipennis,** new species

Temple without an upper posterior swelling, the occipital carina evenly curved; intercubiti parallel or weakly convergent, the areolet quadrangular or subpentagonal 5

5. Second and third tergites black; coxae ferruginous 6

Second and third tergites entirely or largely ferruginous, or if rarely mostly or entirely black, then the coxae also black 7

6. Mesoscutum mat and punctate, a median stripe on each of its three lobes polished and punctate; punctures on second tergite small, separated by about 2.3 their diameter; tip of upper valve of ovipositor a little less stout (fig. 327,b) . . . . **2. alutarius,** new species

Mesoscutum entirely polished and punctate; punctures on second tergite large, separated by about 0.6 their diameter; tip of upper valve of ovipositor a little stouter (fig. 327,e) . . . . **3. montanus,** new species

7. Front wing 7.5 to 8.5 mm. long; propodeal crests very high; hind basitarsus stramineous; tip of ovipositor more slender (fig. 327,a). **1. grandis,** new species

Front wing 3.0 to 7.2 mm. long; propodeal crests not unusually high; hind basitarsus light brown to fuscous; tip of ovipositor less slender (figs. 327,e,f) 8

8. Tip of upper valve of ovipositor with a sharp dorsal ridge from nodus to apex, not flattened near the apex; teeth on tip of lower valve of ovipositor not so close (fig. 327,e); clypeus and central part of face rather strongly convex and weakly punctate; mesopleurum usually less strongly punctate, sometimes hardly at all punctate; punctures on second tergite rather evenly distributed . . . . **5. abbreviator** (Fabricius), some specimens

Tip of upper valve of ovipositor with a sharp dorsal ridge near the nodus, distinctly flattened dorsally near the tip; teeth on tip of lower valve of ovipositor very close (fig. 327,f); clypeus and central part of face weakly convex and rather strongly punctate; mesopleurum usually more strongly and closely punctate; punctures on second tergite distinctly denser on its median half than on its basal and apical quarters 9

9. Base of hind tibia with a white band; punctures on center of face separated by about 1.5 their diameter . . . . **6. lophyri** (Norton)

Base of hind tibia without a white band; punctures on center of face separated by about 0.3 their diameter . . . . **7. neodiprionis** (Cushman)

1. Agrothereutes grandis, new species

FIGURE 327,a

Front wing of male 5.8 to 8.5 mm. long, of female 7.5 to 8.5 mm. long; face rather narrow, its median 0.2 a little raised and with small punctures that are separated by about 1.8 their diameter; cheek unusually long, about 0.83 as long as basal width of mandible in male, about 1.2 as long as basal width of mandible in female; mesopleurum subpolished, with rather coarse strong punctures, these denser in female than in male, mesopleurum also with a little weak wrinkling, that below the subtegular ridge irregular, not longitudinal; propodeal crests exceptionally short and high; apical carina of propodeum in male often traceable across the middle of propodeum; intercubiti subparallel or faintly convergent anteriorly; second tergite strongly mat, in male with medium-sized shallow punctures that are separated by about 0.7 their diameter, in female with moderate-sized punctures that are separated by about 2.5 their diameter; ovipositor tip as in figure 327,a.

Male: Head black. Face white with a pair of complete or incomplete black or brown stripes extending from antennal sockets to clypeal foveae, then around base of mandible; cheek, frontal orbit, lower part of temple, clypeus, mouth parts, and front of scape, white. Prothorax black; usually area on propleurum next to the coxa, collar, broad lower margin of pronotum, hind corner of pronotum, and usually the broad upper margin of pronotum, white. Mesothorax black; tegula, subtegular ridge, often a spot in center of mesoscutum, scutellum, and postscutellum, white; irregular area on mesopleurum, more or less of mesepimeron, and often part of mesosternum a mixture of whitish and fulvous. Metapleurum fulvous with its front and lower margins more or less black, or sometimes black with a median fulvous area; upper division of metapleurum mostly yellowish white; propodeum fulvous, mostly yellowish white below its apical carina; front and middle legs fulvous, their trochanters largely, and all but the apical parts of their tarsi pale yellowish; hind coxa, trochanter, and femur fulvous, the apical 0.1± of femur usually a little infuscate; hind tibia fulvous, its basal 0.18± paler and its apical 0.35± infuscate, its extreme apex often fulvous; hind tarsus white, the tip of its last segment fulvous; abdomen fulvous, the basal 0.6± and apical 0.1± of its first segment yellowish fulvous, its seventh tergite without a white spot but sometimes with a yellowish fulvous area.

Female: Black. Usually a small stripe on frontal orbit, a stripe on upper side of flagellum that covers about 6 segments, collar, tegula, subtegular ridge, usually the postscutellum and a spot on scutellum, small apical area on sixth tergite, and large spot on seventh tergite, white; antenna dark brown or blackish, except for the white stripe on flagellum; clypeus and mandible with a ferruginous stain; propodeal crests with a stramineous or fulvous tinge; palpi ferruginous; front and middle legs fulvous, their tarsi except the last segment paler; hind coxa, trochanters, and femur fulvous, the apical 0.1± of the femur weakly infuscate; hind tibia fulvous, increasingly darkened toward the apex, its basal 0.2 yellowish fulvous; hind tarsus stramineous, its last segment yellowish fulvous; abdomen fulvoferruginous, tergites 6–8 mostly infuscate, the sixth and seventh tergites marked with white as described above. Rarely the fifth tergite is also infuscate.

Type: ♀, Lyme, Conn., June 19, 1918, Wm. Middleton (Washington, USNM 63749).

Paratypes (24♂, 12♀): From Connecticut (Green Falls, Lyme, and North Stonington); Maryland (Glen Echo, "Jackson's Island," Plummers Island, and Takoma Park); New Jersey (Moorestown); New York (Greene Co. and Ithaca); Ohio (Akron and Scioto Co.); Pennsylvania (Crisp in Westmoreland Co., Hummelstown, Inglenook in Dauphin Co., Spring Brook, and Valley Forge); South Carolina (Venus); and Virginia (Black Pond in Fairfax Co., Dead Run in Fairfax Co., and Glencarlyn).

Collection dates range from mid-spring to mid-fall. Unusually early and late dates are: May 14 at Spring Brook, Pa.; May 18 at Akron, Ohio; October 4 at Venus, S.C.; and October 16 and 26 at Plummers Island, Md.

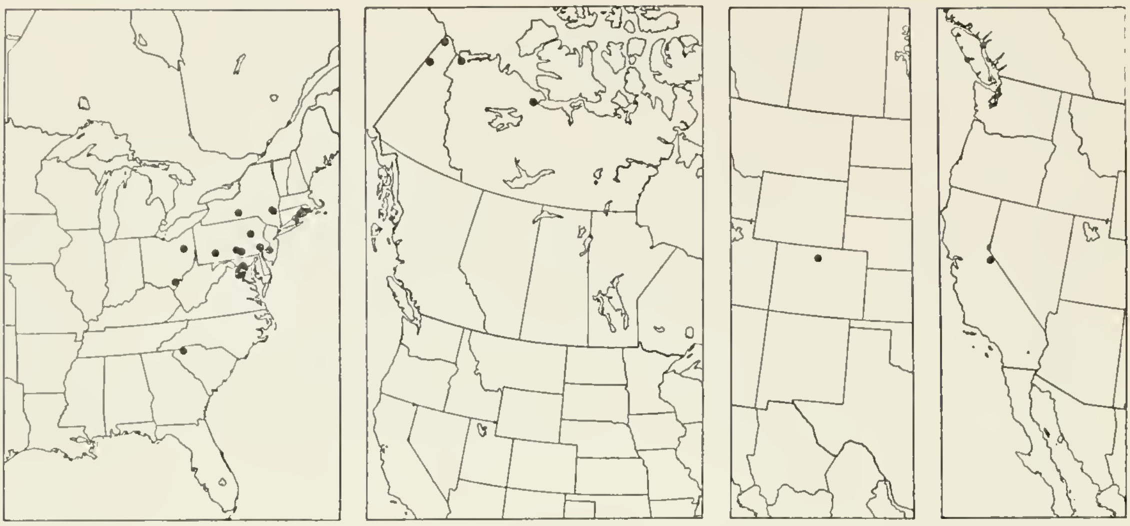
Our collections have been in the undergrowth of rich, deciduous woods.

This species occurs from Connecticut and Ohio south to northwestern South Carolina.

2. Agrothereutes alutarius, new species

FIGURE 327,b

Front wing 3.3 to 5.0 mm. long; clypeus rather small, very strongly convex; face of moderate width, very strongly mat, its median 0.25 a little raised and with fine indistinct punctures; mesopleurum strongly mat, finely wrinkled, and finely punctate in a combination that gives a scabrous surface; mesoscutum rather strongly mat, with small punctures that are separated by about 1.2 their diameter, a median stripe on each of the three mesoscutal lobes often subpolished or polished; propodeal crests weak; intercubiti moderately convergent anteriorly, the areolet subpentagonal; second tergite very strongly mat, with small weak punctures that are separated by about 1.5 their diameter in male, by about 2.3 their diameter in female; ovipositor tip as in figure 327,b.



FIGURES 11–14.—Localities: 11 (left), *Agrothereutes grandis;* 12 (center, left), *A. alutarius;* 13 (center, right), *A. montanus;* 14 (right), *A. pallipennis.*

Black. Scape of female brown in front; flagellum of female uniformly blackish; palpi dark brown; tegula black; coxae and first trochanters of male black, of female ferruginous; second trochanters and femora ferruginous, the apical 0.1± of the hind femur infuscate; front and middle tibiae ferruginous, the middle tibia usually weakly infuscate; front and middle tarsi brown, darker apically; hind tibia and tarsus dark brown or black; wings weakly infuscate; thyridia and narrow apical margin of second and third tergites with a ferruginous tinge.

The males at hand appear to belong with the female type, but have the coxae and first trochanters black rather than ferruginous. This is an unusual sexual difference and it may be that the males represent a separate species.

Type: ♀, Firth River, British Mts., Yukon, July 27, 1956, R. E. Leech (Ottawa).

Paratypes: ♂, Nome, Alaska, July 10, 1951, D. P. Whillars (Ottawa). ♂, Aklavik, Northwest Territories, June 30, 1956, E. F. Cashman (Ottawa). ♂, Coppermine, Northwest Territories, July 6, 1951, S. D. Hicks (Ottawa). 2♂, Firth River, Yukon, July 31, 1956, E. F. Cashman (Ottawa). ♂, Rampart House, Yukon, July 19, 1951, J. E. H. Martin (Ottawa).

This is an Arctic species, known from Alaska and northwestern Canada.

3. Agrothereutes montanus, new species

FIGURE 327,c

Male: Unknown.

Female type: Front wing 5.2 mm. long; clypeus small, very strongly convex; face mat, its central 0.3 weakly mat, rather convex, and with moderately small punctures that are separated by about 0.8 their diameter; mesopleurum a little shining, with close, fine, strong wrinkling; mesoscutum polished, with sharp, medium-sized punctures that are separated by about 0.6 their diameter; intercubiti faintly convergent anteriorly, the areolet subquadrate; second tergite mat, with large shallow punctures that are separated by about 0.6 their diameter; ovipositor tip as in figure 327,c.

Colored like the female of *A. alutarius* except that the palpi are a little darker, there is very little fuscous at apex of hind femur, and wings are more distinctly infuscate.

Type: ♀, Poudre Lake, Rocky Mountain National Park, 11,000 ft., Colo., Aug. 12, 1948, H., G., and D. Townes (Washington, USNM 63750).

4. Agrothereutes pallipennis, new species

Figure 327,d

Front wing 4.0 to 4.5 mm. long; cheek rather long; temple with a prominent dorsoposterior swelling; occipital carina rather weakly curved above, sharply curved downward at the temporal swelling (in all other species of *Agrothereutes* the temporal swelling is absent and the occipital carina is evenly curved); clypeus rather small, strongly convex; face rather wide, weakly mat, with fine punctures that are separated by about 1.8 their diameter, its median 0.25± more strongly convex; mesopleurum with fine, weak, moderately sparse punctures, in places with fine wrinkling that is mostly longitudinal; mesoscutum polished, with small punctures that are separated by about twice their diameter; intercubiti strongly convergent anteriorly, the areolet pentagonal; second tergite weakly mat, with small punctures that are separated by about 1.4 their diameter in male, by about 1.8 their diameter in female; ovipositor tip as in figure 327,d.

Male: Black. Maxillary palpus white, its last segment brown; labial palpus light brown; tegula black; second trochanters and femora brown, the hind femur darkest; front and middle tibiae rather light brown, the basal 0.15 of middle tibia pale brown; hind tibia fuscous brown, its basal 0.15 whitish; front tarsus brown; middle and hind tarsi white, their fifth segments black; wings and wing veins milky white except that subcosta and stigma are brown, the base and apex of stigma whitish; thyridia, apical 0.15 of second tergite, and apical 0.08 of third tergite with a ferruginous tinge.

Female: Black. Antenna brown, fulvous brown basally beneath, the flagellum without a white stripe; palpi fulvous brown; tegula black; front and middle legs beyond first trochanters fulvous brown; hind legs beyond coxa brown, the hind tarsus paler brown; wings with a brownish tinge, paler basally and apically, the wing veins pale brown; apical margin of second and third tergites reddish brown.

The pentagonal areolet of this species is as in the genus *Ischnus*, but the ovipositor tip and general structure are more as in *Agrothereutes*.

Type: ♀, swept from *Artemisia* on U.S. Route 108 on east side of Sonora Pass, 8,000 ft., Calif., July 6, 1948, H., M., G., and D. Townes (Washington, USNM 63751).

Paratype: ♂, swept from *Artemisia* on U.S. Route 108 on east side of Sonora Pass, 8,500 ft., Calif., July 4, 1948, H., M., G., and D. Townes (Townes).

5. Agrothereutes abbreviator (Fabricius)

Figure 327,e

Front wing of male 2.8 to 6.0 mm. long; wings of female often reduced, in which case they are about 0.7 to 0.85 as long as thorax, when fully developed they are 3.0 to 6.5 mm. long; clypeus rather small, strongly convex; face rather narrow, mat, with small, weak punctures that are separated by about 1.5 their diameter in female, a little closer in male, the central 0.25 of the face somewhat raised, convex, less strongly mat, and more distinctly punctate, the punctures in this area a very little closer; mesopleurum subpolished, with irregularly reticulate wrinkling and some punctures, the proportion of punctures to wrinkling variable, the wrinkling just below subtegular ridge irregular or with a vertical tendency; mesoscutum polished or weakly mat, with medium-sized, sharp punctures that are separated by about 0.8 their diameter; mesoscutum of short winged females only sparsely punctate; intercubiti weakly convergent anteriorly, the areolet subquadrate or subpentagonal; second tergite mat, with small, weak punctures that are denser in male than in female; ovipositor tip as in figure 327,e.

Color variable, according to the subspecies, and with much variation within the subspecies.

This species is Holarctic. A classification of the forms grouped under *abbreviator* is difficult, mainly because of the lack of clear-cut characters, the presence of long and short winged females, and the lack of female specimens from many critical areas. We are assuming, with only incomplete proof, that all short winged females of the genus belong to this single species and that this species has subspecies in which a varying proportion of females have long or short wings. We also are assuming that our Nearctic forms are linked by intergrading populations to the European type form. Further collections and studies are needed for the proof or disproof. Of one of the Nearctic subspecies, *A. a. iridescens* of the Alleghanian fauna, we have no female specimens intermediate to either of the other two subspecies, but among the males at hand there are a number that are intergrades on the known characters. The subspecies *similaris* and *rufopectus* appear to intergrade in Alberta and British Columbia.

The treatment below includes the European subspecies *abbreviator*, to show how it differs from the Nearctic forms. We have both short winged and long winged females from Europe, which appear to belong to the same species. Several names have been proposed for the short winged female. It is probable that there are additional names for the long winged female and for the male, but because of scanty European material and lack of access to the types we have given only the reference to the original description of *abbreviator* in the synonymy. We have some Japanese specimens that may be only subspecifically distinct from *abbreviator*, but considering the many taxonomic uncertainties do not discuss these further at this time.

In both Europe and America the species is widespread and abundant. Adults occur among the undergrowth of woods, especially around the edges and in sunlit openings. Both sawfly and lepidopterous cocoons serve as hosts.

MALES

1. Basal 0.18± of hind tibia not at all or only a very little paler than the rest of the tibia, fuscoferruginous to fulvous in color; range: Rocky Mountains from Alberta to New Mexico, and westward to the Pacific Coast. **5c. abbreviator rufopectus** Cushman
   Basal 0.18± of hind tibia distinctly paler than the rest of the tibia, whitish to light brown in color 2
2. Scape fulvous in front; fifth tergite more or less ferruginous or sometimes black; hind coxa fulvous; range: Alleghanian and Carolinian faunas. **5d. abbreviator iridescens** (Cresson)
   Scape brown to black in front; fifth tergite black; hind coxa black or more or less fulvous 3
3. Hind femur usually mostly black, its base more or less ferruginous; apex of first tergite with a whitish band; range: Europe. **5a. abbreviator abbreviator** (Fabricius)
   Hind femur usually ferruginous with its apex black; apex of first tergite fuscous or ferruginous; range: Much of northern North America. **5b. abbreviator similaris** (Provancher)

FEMALES

1. Base of hind tibia without a pale band; flagellum without a median white stripe above or with a stripe that covers usually less than 5 segments; long winged specimens predominant; range: British Columbia and Alberta to California and New Mexico . **5c. abbreviator rufopectus** Cushman
   Base of hind tibia with a pale band; flagellum with a median white stripe above that covers about 5.5 segments 2

2. Third tergite black; specimens nearly all short winged; range: Canadian zone and cooler part of Transition zone from the Atlantic Ocean to the Rocky Mountains and Alaska . . **5b. abbreviator similaris** (Provancher)
 Third tergite ferruginous or mostly so 3
3. Hairs on second tergite rather dense, the hair sockets separated by about 0.7 to 1.3 the length of the hairs; specimens both long winged and short winged; range: Europe . . . . **5a. abbreviator abbreviator** (Fabricius)
 Hairs on second tergite sparse, the hair sockets separated by about 1.8 the length of the hairs; specimens all long winged; range: Alleghanian and Carolinian faunas . . . . **5d. abbreviator iridescens** (Cresson)

5a. Agrothereutes abbreviator abbreviator (Fabricius)

Ichneumon abbreviator Fabricius, 1793, Entomologia systematica . . . , vol. 2, p. 153. ♀. Type: ♀, "Halae Saxononum Dom. Hybner" (location unknown).

Second tergite of female weakly mat, with rather dense hairs, the hair sockets separated by about 0.7 to 1.3 the length of the hairs. Both short winged and long winged females are common.

The male is very variable in color. In general it is like the Nearctic subspecies *similaris* but with more black on the legs and first abdominal segment, the apex of the first abdominal segment usually white, and often with more extensive white markings, including the scutellum, postscutellum, mark on propodeum, front and middle trochanters, much of front and middle coxae, and basal 0.5± of first abdominal segment.

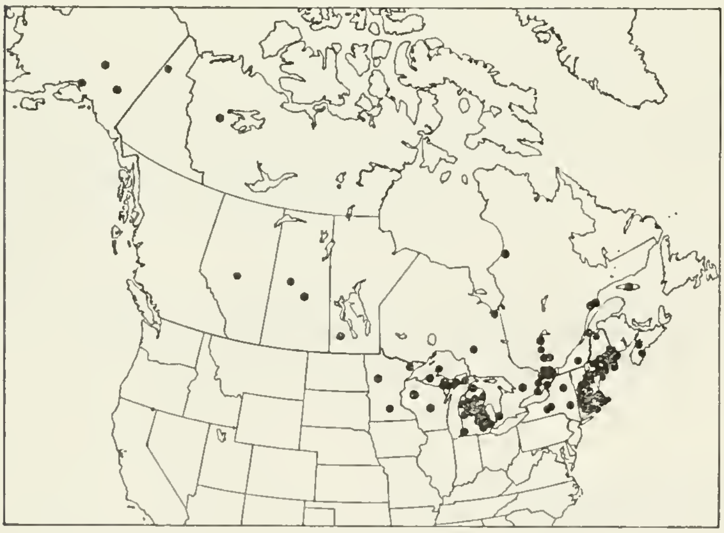


FIGURE 15.—Localities for *Agrothereutes abbreviator similaris.*

The female is colored rather similarly to the female of the Nearctic *iridescens*, but with the fifth and sixth tergites mostly black and in a few of the short winged specimens the thorax ferruginous rather than black.

Specimens: 25♂, 13♀ from Sweden, England, Germany, Austria, and northern Italy.

5b. Agrothereutes abbreviator similaris (Provancher), new status

Phygadeuon similaris Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 57; ♂. Type: ♂, Ottawa, Ont. (Ottawa).

Aptesis major Davis, 1893, Ent. News, vol. 4, p. 32; ♀. Type: ♀, East Lansing, Mich. (East Lansing).

Agrothereutes microalatus Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 4; ♀. Type: ♀, New England (Washington).

Agrothereutes slossonae Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 4; ♀. Type: ♀, Franconia, N.H. (Washington).

Second tergite of female rather weakly mat, with sparse, short, evenly distributed hairs, the hair sockets separated by about 2.0 the length of the hairs. All females but one are short winged. The single long winged specimen was laboratory reared from a *Neodiprion lecontei* cocoon, collected at Gananoque, Ont., 1938 (Ottawa).

Male: Black. Frons sometimes with a small whitish orbital mark; clypeus usually black, rarely yellow; mandible entirely black to entirely yellow; palpi stramineous to white; front of scape light brown to black; tegula, usually subtegular ridge, sometimes tip of scutellum, and sometimes postscutellum pale yellow, the tegula sometimes partly or entirely brown; scutellum sometimes ferruginous; coxae and trochanters varying from entirely black to entirely ferruginous, the front and middle trochanters usually pale yellow; front and middle femora and tibiae ferruginous, the base of middle tibia paler; front and middle tarsi brown, the middle tarsus darker, both tarsi paler at the joints: hind trochanters usually fuscoferruginous or fuscous, the base of the second trochanter paler, often yellow; hind femur ferruginous, its apical 0.2± fuscous, sometimes most of the femur brownish; hind tibia brown or fuscous, its basal 0.18± whitish, stramineous, or light brown, distinctly paler than the rest of the tibia; hind tarsus fuscous, light brown at the joints; first abdominal segment ferruginous or more or less infuscate, its basal 0.5 and apical 0.1 usually a little paler; tergites 2–4 ferruginous, more or less fuscous basally; tergites 5 and following black, the seventh usually with a median apical white spot.

Female: Black. Antenna brown, light brown basally, the flagellum with a median dorsal white stripe that covers about 5.5 segments; palpi brown; tegula fulvous or brown; front and middle legs fulvous or partly or mostly light brown, the bases of their tibiae with an indistinct, narrow, pale band; hind coxa and trochanters fulvous; hind femur brown or fuscous, fulvous, or ferruginous basally; hind tibia brown, its basal 0.18 with a stramineous or light brown band; second and third tergites ferruginous, or the third tergite partly or entirely fuscous; apicomedian area on seventh tergite white.

Specimens (162♂, 49♀): From Alaska (Anchorage, Big Delta, "Camp 334," and Mount McKinley at 2,000 and 2,500 ft.); Alberta (Edmonton); Connecticut (Canaan, Ledyard, and Voluntown); Maine (Aurora, Bar Harbor, Beddington, Boothbay, Bowerbank, Bridgton, Brunswick, Caratunk, Casco Bay, Dallas, Danforth, Ellsworth, Hartland, Hunter's Beach on Mount Desert Island, Machias, Monmouth, Nicatous Lake, Paris, Pittston, Saint Francis, Southwest Harbor, Stratton, Strong, Topsfield, and West Forks); Manitoba (Riding Mountain National Park); Massachusetts (Auburndale, Blue Hills, Campbell Falls near New Marlboro, Cummington at 1,400 ft., Fitchburg, Framingham, slide on Greylock Mt. at 3,000 ft., Holliston, North Carver, Royalston, and South Hadley); Michigan (Ann Arbor Third Woods, Bay Co., Cheboygan Co., Crawford Co., Delta Co., Dickinson Co., East Lansing, George Reserve in Livingston Co., Gladwin Co., Gratiot Co., Iosco Co., Iron Co., Isabella Co., Keweenaw Co.. Lake Co., Macomb Co., Midland Co., Montcalm Co., Naubinway, Newaygo Co., Ontonagon Co., Roscommon Co., Saginaw Co., 14 miles north of Scottville, Warren Dunes in Berrien Co., Wexford Co., and Yellow Dog Plains in Marquette Co.); Minnesota (Lake Co., Lake Itasca, and Sibley Co.); New Hampshire (Base Station on Mount Washington, Gorham, Jaffrey, Pinkham Notch, Randolph, and Rumney); New York (Ithaca, McLean Reservation in Tompkins Co., Saranac Lake, and Troy); Northwest Territories (Norman Wells); Nova Scotia (Aldershot and White Point Beach in Queens Co.); Ontario (Gananoque, Leitrim near Ottawa, Miners Bay, Moose Factory, Ottawa, Renfrew, Sarnia, Smoky Falls on Mattagami River, Trenton, and Tweed); Quebec (Anticosti [Island], Aylmer, Baie Comeau, Burbidge, Godbout, Great Whale River, Hull, Kazabazua, Knowlton, Maniwaki, Parke Reserve in Kamouraska Co. at 950 ft., Poltimore, and Queens Park in Aylmer); Rhode Island (Westerly); Saskatchewan (Nipawin and Waskesiu [Lake]); Vermont (Lake Willoughby at 1,400 ft., Laurel Lake near Jacksonville, South Newfane, and Woodstock); Wisconsin (Nekoosa and Sawyer Co.); and Yukon (Rampart House).

Collection dates are mostly in the summer, but are distributed from mid-spring to mid-fall. The earliest and latest dates are: May 5 in Washtenaw Co., Mich.; May 7 at East Lansing, Mich.; May 8 at South Hadley, Mass.; May 12 at Cummington, Mass.; September 16 in Sibley Co., Minn.; October 2 at Framingham, Mass.; October 22 at Mount Desert, Maine.; and November 4 at Poltimore, Que.

Rearing records on the pin labels include 14 reared lots (single specimens or several) from *Heterarthrus nemoratus*, 4 from *Diprion* *hercyniae*, 2 from *Pristiphora erichsonii*, and 1 each from *Neodiprion abietis*, *N. lecontei*, and *N. sertifer*.

This subspecies occurs in the Canadian zone and cooler parts of the Transition zone, from the Atlantic Ocean to the Rocky Mountains and Alaska. It has been reared from cocoons of several species of sawflies.

5c. Agrothereutes abbreviator rufopectus Cushman, new status

Agrothereutes rufopectus Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 4; ♀. Type: ♀, Bilby, Alta. (Washington).

Second tergite of female mat, with rather sharp microreticulation, with short, moderately sparse, evenly distributed hairs, the hair sockets separated by about 1.5 the length of the hairs. Twenty-six females are known. Of these 6 have short wings, 19 long wings, and 1 has wings of intermediate length. The specimen with intermediate wings was reared from a cocoon of *Pristiphora erichsonii* at Phoenix, B.C., June 20, 1950 (Ottawa). Two long winged females were reared from the same batch of cocoons and are also in the Ottawa collection.

Male: Ground color black, or in two specimens from Glendale, Calif., the ground color fulvous with the head mostly black. Clypeus black, or sometimes white; mandible entirely yellow to entirely black; palpi whitish to fuscous; scape black or blackish brown; tegula white, brown, or blackish; subtegular ridge, scutellum, and postscutellum sometimes marked with yellow; propodum rarely with its apical part ferruginous; front and middle coxae black, partly black, or rarely entirely yellowish and fulvous; hind coxa black; trochanters varying from mostly pale yellow to entirely black, the hind first trochanter nearly always black or infuscate; femora fulvous or ferruginous the apical 0.2 of hind femur infuscate; front and middle tibiae fulvous; hind tibia reddish brown, its basal 0.2 ± often paler brown than the rest; tarsi brown, paler at the joints, the hind tarsus darkest and front tarsus palest; first abdominal segment black with its apex ferruginous or entirely ferruginous; tergites 2–4 ferruginous, sometimes fuscous basally; tergite 5 black, sometimes more or less ferruginous; tergites 6 and 7 black, the seventh sometimes with a small median apical white spot.

Female: Head entirely black or the clypeus and sides of face stained with ferruginous; mandible black; palpi fuscous; antenna brown, pale brown basally, the flagellum sometimes with a median whitish stripe above that covers as much as 4 segments; thorax entirely black to entirely ferruginous or rarely fulvous, in short winged specimens from southern British Columbia and Alberta often black with the mesoscutum and more or less of other areas ferruginous; legs ferruginous or rarely fulvous, the hind tibia a little darkened and its basal 0.2± often a little paler; abdomen ferruginous, rarely fulvous, the fourth and following tergites black, or in specimens with the thorax ferruginous or fulvous, these segments also partly or entirely ferruginous or fulvous; seventh tergite with a median apical white area.

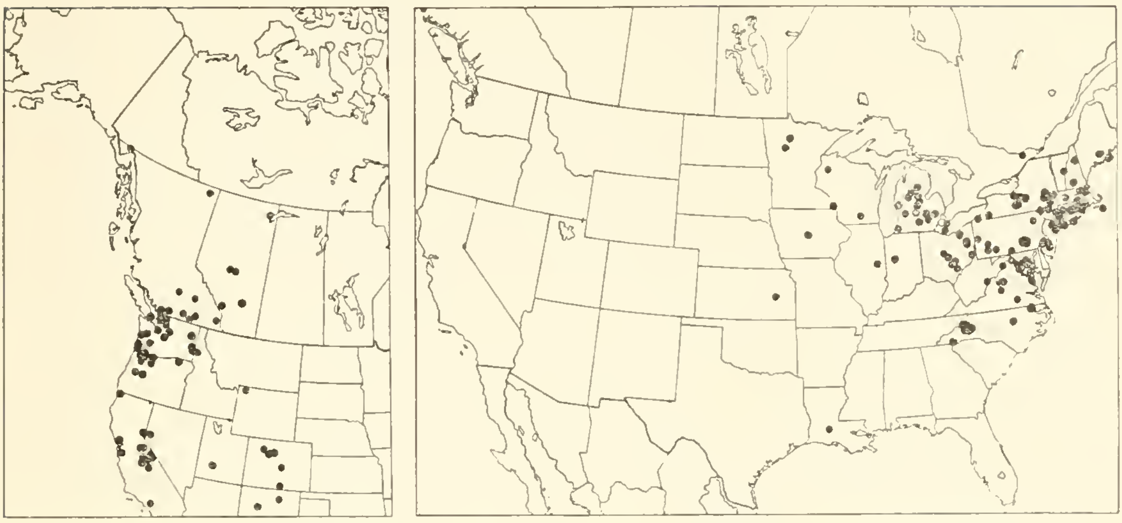
Specimens from British Columbia and Alberta, among them the type specimen, are often intermediate to the subspecies *similaris*. Male specimens from Colorado tend to be intermediate to the subspecies *iridescens*, and a male from Morley, Colo., is quite intermediate.

Specimens (107♂, 39♀): From Alberta (Banff, Bilby, Drumheller, Edmonton, and Fort Chipewyan on Athabasca Delta); British Columbia (Chilkat Pass at Mile 42 on Alaska Border at 900 ft., Fort Nelson, Glenemma on Salmon River, Keremeos, Lizard Creek near Fernie, Oliver, Phoenix, Robson, Sicamous, Sumas Prairie, and Victoria); California (Crane Flat in Yosemite Park, Crescent City, Dardanelle, Fish Camp, near Glacier Point in Yosemite Park, Glendale, Lake Pilarcitos in San Mateo Co., Leevining, Mill Valley, Mirror Lake at 4,096 ft., near Sonora Pass at 8,000 ft., Tallac Lake near Tahoe, and Tamarack Flat in Yosemite Park); Colorado (Elbert, near Estes Park, Morley, Phantom Valley in Rocky Mountain National Park at 9,400 ft., and Steamboat Springs); Idaho (Moscow Mt.); Nevada (Sparks); New Mexico (Cimarron at 6,800 ft., Jemez Springs, and Tajique); Oregon (Cannon Beach, Cornelius, Forest Grove, Hillsboro, McMinnville, Portland, Seaside, Sweet Home, Timberline Lodge on Mount Hood at 6,000 to 9,500 ft., Trout Creek Camp south of Santiam Pass in Linn Co., Warrenton, and Wild Horse Mt. at Athena); Utah (20 miles east of Salina); Washington (Ashford, Barnes State Park, Chuckanut Drive ½ mile south of Skagit Co. line, Easton, Gulf Road in Whatcom Co., Hoquiam, Marietta, Pullman, S.C.S. Nursery in Bellingham, Tacoma, Valleyford, Wawawai, and Westport); and Wyoming (Mammoth Hot Springs in Yellowstone Park).

Collection dates are distributed from mid-spring to early fall. Unusually early and late dates are: April 18 at Victoria, B.C.; May 9 and 15 at Cornelius, Oreg.; May 14 at Wild Horse Mountain, Athena, Oreg.; September 14 at Elbert, Colo.; and September 24 and 28 and October 3 at Hillsboro, Oreg.

Reared specimens are as follows: ♀, reared from *Neodiprion tsugae*, Sweet Home, Oreg., June 1, 1937. 3♀, reared from *Pristiphora erichsonii*, Phoenix, B.C., June 20, 1950. 4♀, reared from cocoons of *Laspeyresia nigricana*, Sumas Prairie, B.C., material collected 1945, parasites emerged May 1946.

This subspecies ranges from the Rocky Mountains to the Pacific Ocean, from northern British Columbia to New Mexico and southern California.



FIGURES 16, 17.—Localities: 16 (left), *Agrothereutes abbreviator rufopectus;* 17 (right), *A. a. iridescens.*

5d. Agrothereutes abbreviator iridescens (Cresson), new status

Cryptus iridescens Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 296; ♂. Type: ♂, Delaware (Philadelphia).

Cryptus soror Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 296; ♂. Name preoccupied by Trentepohl, 1829. Type: ♂, Delaware (Philadelphia).

Cryptus albonotatus Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 75; ♂. Type: ♂, Ottawa, Ont. (Ottawa).

Spilocryptus propodeum Cushman, 1920, Proc. U.S. Nat. Mus., vol. 58, p. 253; ♂. Type: ♂, North East, Pa. (Washington).

Second tergite of female strongly mat, with moderately long, sparse, evenly distributed hairs, the hair sockets separated by about 1.8 the length of the hairs. Only long winged females are known.

Male: Black. Frontal orbit usually with a short white stripe; facial orbit often narrowly white; sometimes a white mark on cheek; clypeus white, fulvous, ferruginous, or black; mandible entirely white to entirely black; palpi white, their apices pale brown; scape entirely fulvous or fulvous only in front; tegula white; usually the collar, hind corner of pronotum, subtegular ridge, apical part of scutellum, and postscutellum, white; often a pair of whitish areas just below the propodeal crests; rarely the lower and upper edges of pronotum, all of scutellum, upper division of metapleurum, restricted areas on mesopleurum and mesosternum, and all of propodeum beyond the apical carina, white; front and middle coxae entirely fulvous or more or less white; hind coxa fulvous, sometimes infuscate basally; front and middle trochanters white, usually with some fulvous areas; hind first trochanter fulvous, often weakly infuscate; hind second trochanter fulvous and whitish; femora fulvous, the apical 0.2± of hind femur infuscate; front and middle tibiae pale fulvous, the base of middle tibia whitish; hind tibia fulvous brown, its basal 0.2 yellowish white; front and middle tarsi brown, the front tarsus paler and both tarsi pale brown at the joints, hind tarsus brown with pale brown joints, or the third segment and more rarely the second, fourth, and apical 0.1± of the first segment, white or largely white; first abdominal segment fulvous, its apex and its basal 0.6± paler; tergites 2–5 fulvous, often infuscate basally, sometimes the fifth tergite mostly or entirely black; sixth tergite fulvous to black; seventh tergite black, usually with a median apical white mark.

Female: Black. Frons often with a short white stripe on orbit; clypeus and mandible black or ferruginous; palpi fulvous or light brown; antenna dark brown, fulvous basally, the flagellum with a median white stripe above that covers about 6 segments; tegula fulvous; subtegular ridge often with a small white mark; front and middle legs fulvous, the base of middle tibia paler; hind coxa, trochanters, and femur fulvous or fulvoferruginous, the apical 0.2 to 0.3 of the femur infuscate; hind tibia fulvous brown, its basal 0.2 whitish; hind tarsus fulvous; abdomen fulvoferruginous, the fifth to seventh tergites infuscate above and the seventh with a large median white spot.

Specimens (513♂, 141♀): From Connecticut (Canterbury, Fairview near Meriden, Green Falls, Lebanon, Litchfield, Stonington, Voluntown, and Woodstock); District of Columbia (Georgetown and Washington); Illinois (southern Illinois and Urbana); Indiana (Lafayette); Iowa (Ames); Kansas (Franklin Co.); Louisiana (Opelousas); Maine (Bar Harbor and Monroe); Maryland (Beltsville, Bowie, Cabin John, Chesapeake Beach, Glen Echo, near Great Falls, Patuxent Refuge near Bowie, Plummers Island, and Takoma Park); Massachusetts (Auburndale, Fitchburg, Holliston, Medford, Nantucket, and South Hadley); Michigan (Ann Arbor, Clinton Co., East Lansing, George Reserve in Livingston Co., Gladwin Co., Gratiot Co., Jackson Co., Kent Co., Midland Co., Missaukee Co., Muskegon Co., Oakland Co., Osceola Co., Roscommon Co., and Warren Woods in Berrien Co.); Minnesota (Bemidji, Houston Co., and Itasca); Missouri; New Hampshire (Jaffrey and Randolph); New Jersey (Clifton, Moorestown, and Riverton); New York (Babylon, Bemus Point, Canajoharie, Eastport, Farmingdale, Greene Co., Hancock, Ithaca, Lott Wood near Flatbush, McLean, Millwood, Oneonta, Poughkeepsie, Shokan, Six Mile Creek near Ithaca, Syracuse, Troy, Van Natta's Dam in Ithaca, and Wayne Co.); North Carolina (Asheville, Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Hamrick, Highlands, Marion, Mount Mitchell at 5,200 ft., Murfreesboro, North Fork of Swannanoa [River] at Black Mt., Mount Pisgah at 4,600 ft. and 4,800 to 5,749 ft., and Wake Co.); Ohio (Akron, Barberton, Bedford, Bridgeport, Catawba

Island near Put-in-Bay, Columbus, Delaware Co., Hocking Co., Shawnee Forest, and Sugar Grove); Ontario (Point Pelee); Pennsylvania (Camphill, Crisp in Westmoreland Co., Gladwyne, Harrisburg, Highspire, Inglenook in Dauphin Co., Jeannette, New Cumberland, North East, Philadelphia, Pittsburgh, Slippery Rock Creek in Lawrence Co., Spring Brook, Swarthmore, and near Webster Mills); Rhode Island (Ashaway, Charlestown, Kingston, and Westerly); Vermont (Norwich); Virginia (Arlington, Chain Bridge, Charlottesville, Falls Church, Glencarlyn, Great Falls, Mathias Point, Passage Creek near New Market Gap, Petersburg, Rosslyn, and Skyline Drive); West Virginia (Bolivar, Cheat Mt. in Randolph Co., and Lost River State Park in Hardy Co.); and Wisconsin (Madison and Sawyer Co.).

Dates of collection are rather evenly distributed from mid-spring to mid-fall. Unusually early and late seasonal records are: April 7 and 14 at Bowie, Md.; April 19 at Falls Church, Va.; April 17 and 22 at Cabin John, Md.; April 28 in Gladwin Co., Mich.; October 6 in Midland Co., Mich.; October 21 and November 3 at Great Falls, Va.; and November 2 at Charlottesville, Va.

Reared specimens comprise a short series from *Polychrosis viteana*, reared at North East, Pa., by R. A. Cushman in 1917, and a male from *Diprion frutetorum*, reared at Litchfield, Conn., Aug. 20, 1941.

This subspecies occurs in the Alleghanian and Carolinian faunas. It is often very common.

6. Agrothereutes lophyri (Norton)

FIGURE 327,f

Front wing 4.2 to 6.2 mm. long; clypeus moderately large, weakly convex; face moderately wide, weakly convex, mat, with moderate-sized punctures that are separated by about 0.7 their diameter, the median 0.25 of face only weakly raised; mesopleurum subpolished, with moderately coarse, strong, crowded punctures, the punctures below the middle more crowded and obscured by wrinkling, just below the subtegular ridge also some irregular wrinkling that has a vertical tendency; mesoscutum subpolished, with medium-sized, rather sharp punctures that are separated by about 0.8 their diameter; intercubiti faintly convergent anteriorly, the areolet subquadrate; second tergite mat, with distinct, medium-sized punctures which are sparse on the basal 0.1 and apical 0.4 of the tergite, on the rest they are more closely spaced and separated by 1.5 to 2.5 their diameter; ovipositor tip as in figure 327,f.

This species is an important parasite of various Diprionidae.

There are three subspecies, differing in color as keyed and described below:

1. Hind coxa and femur black; tergites 2 and 3 mostly or entirely black; range: New Brunswick and Newfoundland . . **6b. lophyri obscurus,** new subspecies
   Hind coxa, some or most of hind femur, and all of tergites 2 and 3 ferruginous 2
2. Apex of hind femur strongly infuscate or most of the femur fuscous; tergite 6 of male and tergite 4 of female black; propodeum of female entirely black; range: Quebec and New Jersey to British Columbia, mostly in the Canadian zone . . . . **6a. lophyri ontariensis,** new subspecies
   Apex of hind femur weakly or not at all infuscate; tergite 6 of male and usually tergite 4 of female ferruginous; propodeum of female usually marked with white; range: Austroriparian and Carolinian faunas. **6c. lophyri lophyri** (Norton)

6a. Agrothereutes lophyri ontariensis, new subspecies

Punctures on head and thorax a little weaker than in the subspecies *lophyri*.

Male: Black. Rather wide frontal and facial orbit (but narrowed or interrupted just above antennal socket), part or all of clypeus, part or all of mandible, palpi, collar, lower margin and hind corner of pronotum, usually a spot on upper end of epomia, tegula, subtegular ridge, scutellum, postscutellum, and a mark like a broad inverted U on propodeum, white; front of scape stramineous to light brown; front and middle legs fulvous, the front coxa sometimes fuscous basally, both coxae usually partly white, the trochanters mostly white but the basal one infuscate above, the bases of tibiae whitish or pale fulvous, and the tarsi light brown with the last segment blackish brown; hind coxa, second trochanter, and femur ferruginous, the apical 0.18 to 0.3 of the femur fuscous; hind first trochanter fuscoferruginous to fuscous; hind tibia fuscous or dark brown, its basal 0.2 white; hind tarsus white, its fifth segment black, its first segment usually fuscous basally but at least the apical 0.4 of the first segment white; first abdominal segment ferruginous, its basal 0.5 and apical 0.1 yellowish fulvous; tergites 2–5 ferruginous, the apex of fifth tergite black; tergites 6 and 7 black, the seventh with a large median apical white spot.

Female: Black. Palpi brown; antenna dark brown, lighter brown basally, the flagellum with a median white stripe above that covers about 5.5 segments; tegula dark brown, rarely white; collar usually with some white; subtegular ridge and lower margin of pronotum rarely white; front and middle legs ferruginous but with a weak infuscation, the bases of their tibiae stramineous; hind coxa, trochanters, and femur ferruginous, the trochanters sometimes infuscate and the apical 0.3 to 0.7 of the femur fuscous; hind tibia and tarsus dark brown, the basal 0.2 of the tibia white; wings weakly infuscate; first three abdominal segments ferruginous, the rest black, the seventh tergite with a large median apical white spot.

Type: ♀, reared from *Neodiprion lecontei*, Cadillac, Mich., Aug. 23, 1948, D. M. Benjamin (Washington, USNM 63752).

Paratypes (32♂, 36♀): From British Columbia (near Barrière, Little Fort, and Trinity Valley); Maine (Brunswick, Lincoln, and Pemaquid Harbor); Manitoba (Aweme and Hamiota); Michigan (Cadillac, Cheboygan Co., Genesee Co., and Midland Co.); Minnesota (Lake Co.); New Brunswick (Acadia Forestry Station in Sun Co.); New Hampshire (Somersworth); New Jersey (Lamington); Ontario (Biscotasing, Hawk Lake, Iris Township, Kemptville, Little Current, Oakville, Renfrew, Sauble Beach, Saulte Ste. Marie, Smoky Falls on Mattagami River, Thessalon, and Tweed); Quebec (Berthier, Berthier Lake, Gracefield, Kazabazua, Laniel, Montreal, and St. Esprit); and Wisconsin (Apple River in Polk Co.).

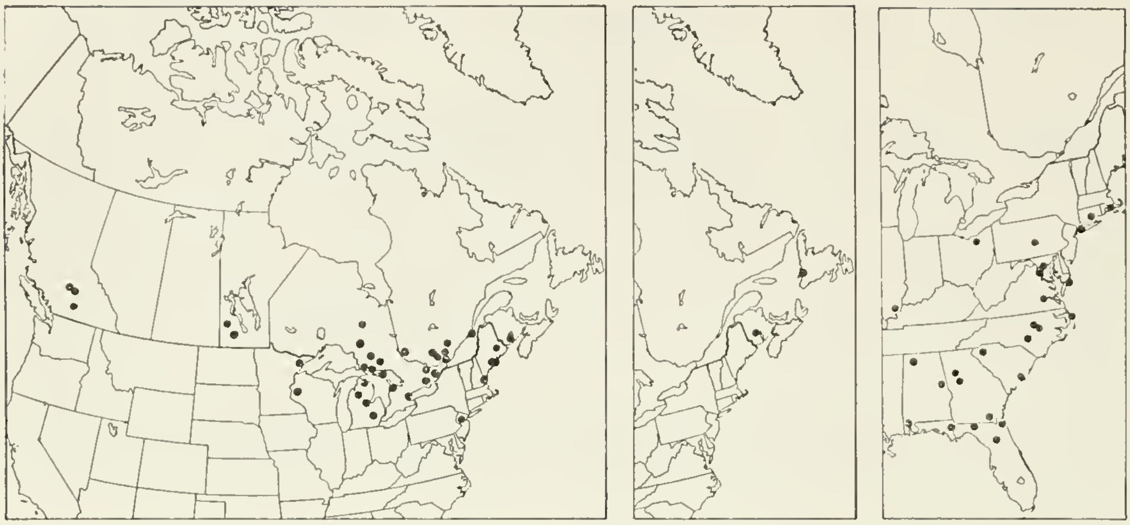
The majority of the specimens at hand were reared. The few collected specimens indicate an adult season from mid-spring to early fall, the earliest date of capture being May 15 in Midland Co.,Mich., and the latest "September" at Somersworth, N.H. Rearings are all from cocoons of diprionid sawflies, as follows: 7 reared lots from *Neodiprion abietis*, 4 from *N. lecontei*, 1 from *N. nannulus nannulus*, 1 from *N. pratti banksianae*, 1 from *Neodiprion* sp. on *Pseudotsuga*, 2 from *Neodiprion* sp., 3 from *Diprion similis*, and 1 from "spruce sawfly."

This subspecies is transcontinental in the Canadian zone and occurs in some of the cooler parts of the Transition zone.

6b. Agrothereutes lophyri obscurus, new subspecies

Punctures on head and thorax a little weaker than in the subspecies *lophyri*.

Male: Black. Frontal and facial orbits (narrowed just above antennal socket), clypeus, mandible, palpi, collar, tegula, subtegular ridge, scutellum, postscutellum, and a pair of large spots on hind part of propodeum, white; front and middle coxae fuscous, their apices more or less whitish; hind coxa black; front and middle trochanters white, the first trochanter brown above; hind trochanters black; front and middle femora and tibiae fulvous brown, the bases of the tibiae stramineous; front and middle tarsi light brown, paler at the joints; hind femur and tibia black, the basal 0.2 of the tibia white; hind tarsus white, the basal 0.3 to 0.75 of the first segment fuscous and the last segment black; first abdominal segment fuscous, its basal 0.4 and apical 0.1 pale brown; second and following tergites black, the apical 0.3± of the second and third ferruginous, the seventh with a median apical white spot.



FIGURES 18–20.—Localities: 18 (left), *Agrothereutes lophyri ontariensis;* 19 (center), *A. l. obscurus;* 20 (right), *A. l. lophyri.*

Female: Black. Palpi and antenna blackish brown, the flagellum with a median white stripe above that covers about 5 segments; tegula and legs dark brown or blackish, the bases of the front and middle tibiae stramineous and the basal 0.15 of the hind tibia white; wings weakly infuscate; apex of first tergite and base and apex of second tergite tinged with ferruginous; seventh tergite with a large median white spot.

Type: ♀, reared from *Neodiprion abietis*, Black Duck, St. George, Newfoundland, Sept. 8, 1947 (Ottawa).

Paratypes: 2♂, reared from *Neodiprion abietis*, Fredericton, N.B., Sept. 6 and 17, 1934, C. E. Atwood (Ottawa). ♀, reared from *Neodiprion abietis*, "Gollant's" (Nfld.?), June 25, 1947 (Ottawa).

6c. Agrothereutes lophyri lophyri (Norton)

Cryptus Lophyri Norton, 1869, Trans. Amer. Ent. Soc., vol. 2, p. 326; ♂, ♀. Lectotype: ♀, Connecticut (Philadelphia).

Punctures on head and thorax a little stronger than in the other two subspecies.

Male: Black. Wide orbits on front, face, and lower part of temple, sometimes a central spot on face, cheek, clypeus, mouth parts, often lower part of propleurum, collar, stripes on lower and upper margins of pronotum (the stripe on upper margin sometimes interrupted), tegula, subtegular ridge, scutellum, postscutellum, often small spot on mesopleurum and metapleurum next to their coxal sockets, part of upper division of metapleurum, much or all of hind face of propodeum, and front and middle coxae and trochanters, white, the coxae more or less fulvous basally; scape fulvous, brownish above; front and middle legs beyond trochanters fulvous, their tibiae paler at base and their tarsi brown apically; hind coxa, trochanters, and femur ferruginous, the apical 0.15± of the femur often weakly infuscate; hind tibia reddish brown, its basal 0.2 white; hind tarsus white, its last segment black and as much as the basal 0.6 of its first segment fuscous; abdomen light ferruginous, the basal 0.5 and apical 0.1 of its first segment yellowish, tergite 7 often infuscate, and a large apical spot on tergite 7 white. Sometimes the median apical part of tergite 6 is white.

Female: Facial and frontal orbits, clypeus, and mandible usually white but sometimes brown or black; palpi fulvous; antenna brown, paler basally, the flagellum with a median white stripe above that covers about 6 segments; collar, lower margin of pronotum, usually upper margin of pronotum, tegula, subtegular ridge, scutellum, postscutellum, and spot of variable size below each propodeal crest, white; front and middle legs fulvoferruginous, their fifth tarsal segments brownish; hind coxa, trochanters, and femur ferruginous, the apical 0.15± of the femur often weakly infuscate; hind tibia pale brownish ferruginous, its basal 0.2 stramineous; hind tarsus fulvous; abdomen light ferruginous, the fifth, sixth, and seventh tergites usually more or less infuscate above, the seventh with a large median apical white spot. Sometimes, in specimens tending toward the subspecies *ontariensis*, the fourth and following tergites are infuscate.

Norton's types were from eastern Connecticut, on the border of the range of the subspecies *ontariensis*, and their characters are intermediate. They seem a little closer to the southern form, however, so the name is applied here.

Specimens (23♂, 25♀): From Alabama (Kushla, Pyriton in Clay Co., and Wilson Dam); Connecticut (New Haven); Florida (Gainesville, Jacksonville, Monticello, and Torreya State Park); Georgia (Atlanta, Billy's Island in Okefenokee Swamp, and Griffin); Illinois (Shawnee National Forest near Harrisburg); Maryland (Patuxent Refuge near Bowie); Massachusetts (Horseneck Beach near Westport); New York (Sea Cliff); North Carolina (Kill Devil Hills, Southern Pines, Wake Co., and Wilson Co.); Ohio (Bedford); Pennsylvania (Spring Mills); South Carolina (Charleston and Greenville); and Virginia (Chincoteague Island, Dunn Loring, Petersburg, and Vienna).

Dates of collection indicate an adult season from late spring to mid-fall. Unusually early and late dates are: April 8 in Torreya State Park, Fla.; April 11 at Gainesville, Fla.; May 4 in Wake Co., N.C.; May 26 at Bowie, Md.; October 12 in Wilson Co., N.C.; and October 29 at Vienna, Va. There are 3 lots of specimens reared from *Neodiprion lecontei*, 1 from *N. abbotii*?, 2 from *Diprion similis*, and 1 from "pupa from under bark of pine stump."

This subspecies occurs in the Carolinian and Austroriparian faunas.

7. Agrothereutes neodiprionis (Cushman)

Spilocryptus neodiprionis Cushman, 1939, Journ. Washington Acad. Sci., vol. 29, p. 393; ♂, ♀. Type: ♀, Sweet Home, Oreg. (Washington).
BIOLOGY: Furniss and Dowden, 1941, Journ. Econ. Ent., vol. 34, pp. 49, 51.

Front wing 5.3 to 6.5 mm. long.

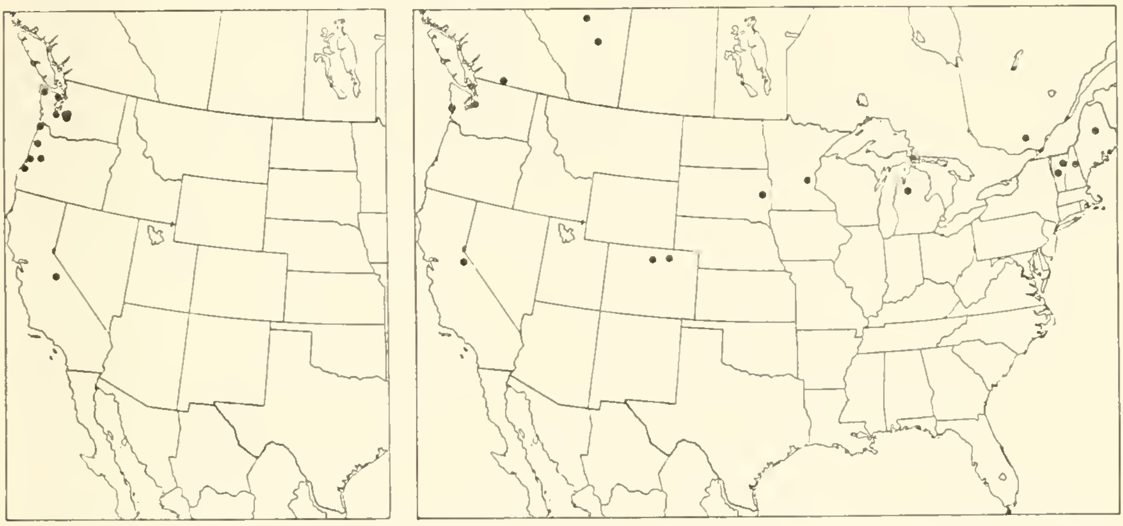
This is very similar to *A. lophyri* and may prove to be a subspecies of it. The punctures on the head and body are distinctly finer and denser than in *lophyri*, punctures on second tergite a little finer and denser, and the ovipositor tip perhaps a little narrower. The punctures on the center of the face are adjacent and crowded.

Male: Black. Clypeus, mandible, palpi, tegula, and small mark on subtegular ridge, white; front and middle legs fulvous, their tarsi brown apically; hind coxa, trochanters, and femur ferruginous, the first trochanter and apical 0.12± of the hind femur often a little infuscate; hind tibia brownish ferruginous, its base a little paler; hind tarsus brown, the apical 0.12 of the first segment, some or all of second segment, all of third and fourth segments, and usually the base of fifth segment, white; abdomen ferruginous, the basal 0.7± of the first segment more or less infuscate, fifth segment often more or less infuscate, and sixth and seventh segments black, the seventh without a white spot.

Female: Black. Clypeus stained with ferruginous or white medially; mandible usually with a ferruginous stain; palpi brown; scape red brown; pedicel and flagellum brown, the flagellum often with a whitish stain on upper side of 2 to 4 of its median segments; tegula dark brown; front and middle legs ferruginous; hind coxa, trochanters, and femur ferruginous, the apex of femur weakly infuscate; hind tibia brownish ferruginous, a little paler basally; hind tarsus ferruginous, the last segment brown; first three abdominal segments ferruginous, the rest black, the seventh tergite with a relatively small median apical white spot.

Specimens: ♂, Tamarack Flat, Yosemite Park, Calif., July 24, 1948, H., M., D., G., and J. Townes (Townes). ♀, Coos Bay, Oreg., July 9 to 10, 1951, Borys Malkin (San Francisco). 3♀, Glenada, Oreg., July 11, 1951, Borys Malkin (San Francisco). ♂, near summit of Mary's Peak, Benton Co., Oreg., July 4, 1941, G. R. Ferguson (Corvallis). ♂, Seaside, Oreg., Aug. 10, 1940, H. and M. Townes (Townes). 4♂, 3♀ (paratypes), reared from *Neodiprion tsugae*, Sweet Home, Oreg., April 1936 and Oct. 9, 1936 (Washington and San Francisco). ♂, ♀, Ashford, Wash., July 6 and 10, 1940, H. and M. Townes (Townes). ♀, Carbon River, Mount Rainier, Wash., 2,000 to 3,000 ft., Oct. 3, 1954, B. Malkin and Alan Bryan (San Francisco). ♂, Elbe, Wash., July 13, 1940, H. and M. Townes (Townes). ♂, Forks, Wash., July 3, 1920, E. P. Van Duzee (San Francisco). 7♂, 2♀, Mount Rainier, Wash., at 2,900 ft., 4,000 ft., 4,700 ft., and 5,000 ft., July 7 to Aug. 17, 1940, H. and M. Townes (Townes). ♂, 8 miles south of Quilcene, Olympic National Forest, Wash., July 20, 1950, G. W. Byers (Ann Arbor).

This species occurs from Washington to central California, in the Transition and Canadian zones.



FIGURES 21, 22.—Localities: 21 (left), *Agrothereutes neodiprionis;* 22 (right), *A. cimbcivorus.*

8. Agrothereutes cimbcivorus (Cushman)

FIGURE 327,g

Spilocrpytus (!) *cimbcivorus* Cushman, 1925, Proc. U.S. Nat. Mus., vol. 64, art. 4, p. 8; ♂, ♀. Type: ♀, Brookings, S. Dak. (Washington).

Agrothereutes cimbicivorus Walkley, 1958, U.S. Dep. Agr., Agr. Monog., No. 2, suppl., p. 46. Emendation.

Front wing 4.6 to 7.2 mm. long; clypeus of medium size, moderately convex; face moderately wide, rather weakly convex, its central 0.3 a little raised and more convex; face weakly mat, in male with rather coarse punctures that submedially are crowded, medially separated by about 0.5 their diameter, in female with moderate-sized punctures that submedially are separated by about 0.3 their diameter, medially by about 1.0 their diameter; third flagellar segment of female about 3.5 as long as wide; mesopleurum subpolished, with rather coarse, moderately close punctures which in some areas are partly obscured by wrinkling, the wrinkling mostly irregular but with a slight longitudinal bias, just below the subtegular ridge distinctly longitudinal; mesoscutum polished, with rather coarse punctures that are separated by about half their diameter; intercubiti faintly convergent anteriorly, the areolet subquadrate; second tergite mat, with fine, weak, evenly distributed punctures, the punctures in male separated by about 0.8 the length of the hairs, in female by about 1.2 the length of the hairs; ovipositor tip as in figure 327,g.

Male: Black. Face with a white orbital mark that is broad below and tapers dorsally to end at about midheight of frons; clypeus except marginally and mandible except marginally, white; palpi, often front of scape, and tegula, white; coxae black or dark brown, the hind coxa sometimes partly ferruginous; front and middle trochanters white, dark brown above; hind trochanters blackish or partly fulvous; front and middle legs beyond trochanters ferruginous, their tarsi brown apically; hind femur varying from ferruginous with its apical 0.15 blackish to blackish with its basal 0.15 ferruginous; hind tibia dark brown, its basal 0.18 white; hind tarsus blackish, its middle three segments and often the apex of its first segment white, the base of first segment narrowly light brown or whitish; apical 0.3± of first tergite, all of tergites 2–4, and basal 0.4± of tergite 5 ferruginous; tergite 7 with a median apical white spot.

Female: Black. Flagellum dark brown, a little paler basally, with a median white band (incomplete below) that covers about 5 segments; palpi brown; tegula dark brown; front and middle coxae and trochanters fuscous, usually with ferruginous tinges; front and middle legs beyond trochanters ferruginous, with some weak infuscation; hind coxa, trochanters, and femur ferruginous, the trochanters usually somewhat infuscate and apical 0.3± of the femur fuscous; hind tibia dark brown, its basal 0.15 whitish; hind tarsus brown, its first and last segments a little darker; first abdominal segment ferruginous, its basal half infuscate; tergites 2, 3, and often part of 4 ferruginous, the rest black, the seventh with a median apical white spot.

Specimens (22♂, 19♀): From Alberta (Edmonton and Drumheller); British Columbia (Oliver and Vancouver Island); California (Dardanelle); Colorado (near Estes Park, and Greeley); Maine (Mount Katahdin Summit at 5,215 ft.); Michigan (Chippewa Co. and Lucas); Minnesota (Fridley sand dunes in Anoka Co.); New Hampshire (Mount Madison); Quebec (Lac Mercier); South Dakota (Brookings); Vermont (Plainfield and Rutland); and Washington (San Juan [Island], Seattle, and Westport).

Dates of capture are from late spring to late summer. Unusually early and late dates are: May 25 at Seattle, Wash.; May 30 at Oliver, B.C.; June 7 in Chippewa Co., Mich.; August 20 at Lucas, Mich.; and August 27 at Edmonton, Alta.

There is one reared series: 3♂, 1♀, from *Clavellarius americanus*, Brookings, S. Dak., May 19, 20, and 26, 1891.

This species is transcontinental in the Transition and Canadian zones.

9. Agrothereutes mandator (Linnaeus)

Figure 327,h

Front wing 4.3 to 6.6 mm. long; clypeus of moderate size, almost flat, its apex impressed and with a faint median apical lobe that has a weak median emargination; face wide, rather flat, mat, medially and submedially with moderate-sized punctures that are separated by about 0.5 their diameter; third flagellar segment of female about 5.3 as long as wide; mesopleurum subpolished, with moderate-sized punctures that are separated by about 0.8 their diameter and with fine, irregularly longitudinal wrinkling on most of its surface that partially obscures the punctures; mesoscutum polished, with moderate-sized, rather strong punctures that are separated by about 0.4 their diameter; intercubiti weakly convergent anteriorly, the areolet subquadrate; second tergite mat, with evenly distributed, small setiferous punctures that are separated by about 0.6 the length of the hairs in male, by about 1.0 the length of the hairs in female; ovipositor tip as in figure 327,h.

This species is a gregarious parasite in the cocoons of Clavellariidae. There are European and American subspecies, as keyed and described below:

1. Mesopleural sculpture a little weaker; hind coxa of male black; middle coxa of female fuscoferruginous or blackish; range: Europe.
   9a. mandator mandator (Linnaeus)

   Mesopleural sculpture a little stronger; hind coxa of male and middle coxa of female ferruginous; range: North America.
   9b. mandator americanus, new subspecies

9a. Agrothereutes mandator mandator (Linnaeus)

Ichneumon mandator Linnaeus, 1758, Systema naturae, ed. 10, vol. 1, p. 565. Types: 2♂, without data (Linnaean Society in London).

Mesopleural punctures and wrinkling relatively weak.

The male differs in color from the subspecies *americanus* in averaging less white on thorax, more fuscous on front and middle coxae, and on hind basitarsus, and in having hind coxa black and hind trochanters largely fuscous.

The female differs in color from the subspecies *americanus* in having the clypeus and thorax entirely black except for sometimes a light brown mark on subtegular ridge, front and middle coxae infuscate, trochanters more or less fuscous, and hind tarsus brown, the second through fourth segments often pale brown.

We have not seen the type of this subspecies but have relied on specimens determined by Roman, who has himself studied the type and published his findings (1932, Ent. Tidskr., vol. 53, p. 8).

Specimens: 3♂, 3♀, from Sweden and Germany.

9b. Agrothereutes mandator americanus, new subspecies

Mesopleural punctures and wrinkling relatively strong.

Male: Black. Face and frontal orbit white, the face usually with a brown line on each side of the middle, extending from antennal socket to clypeal fovea, the line often incomplete, sometimes absent; clypeus white, its apical margin dark brown; front of scape white; mandible white; palpi white, brownish apically; collar, often lower part of propleurum, tegula, subtegular ridge, sometimes scutellum, and postscutellum, and sometimes marks next to the sternaulus, white; metapleurum sometimes with a postmedian ferruginous spot; propodeum sometimes with a ferruginous or whitish spot below each of its crests; front and middle coxae white, the coxae often with an apical external fuscous spot; front and middle femora and tibiae fulvous, the bases of the tibiae whitish; front and middle tarsi light brown, pale at the joints, their fifth segments blackish; hind coxa ferruginous, its apex paler; hind trochanters mostly pale fulvous; hind femur ferruginous, its apical 0.2 more or less infuscate, its extreme apex often white; hind tibia dark brown, its basal 0.2 white; hind basitarsus varying from entirely white to black with its basal 0.1 and apical 0.25 white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black; first abdominal segment ferruginous, its basal 0.3± infuscate; tergites 2–5 ferruginous, the apex of the fifth usually fuscous; tergites 6 and 7 black, the sixth ferruginous basolaterally and the seventh with a median apical white spot.

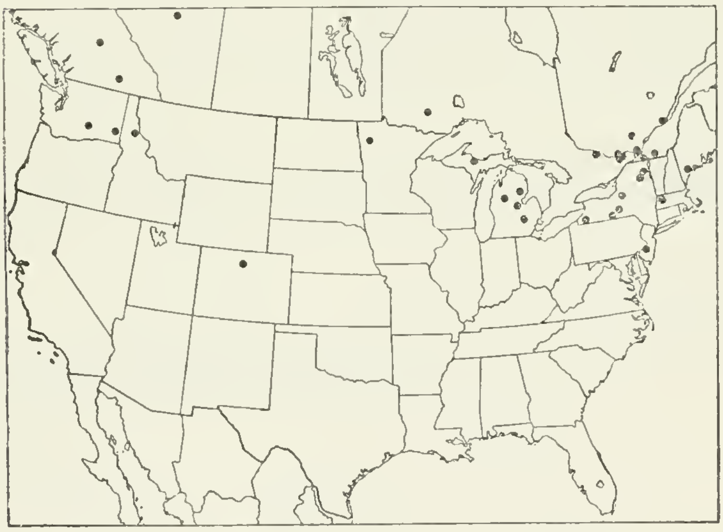


Figure 23.—Localities for *Agrothereutes mandator americanus.*

Female: Black. Sides of face and usually the ventral part of clypeus white; mandible usually with a ferruginous or whitish mark; palpi dark brown; basal three segments of flagellum mostly reddish brown; flagellum with a white band, interrupted below, that covers about 5.5 segments; tegula dark brown; subtegular ridge sometimes white; metapleurum usually with a round postmedial ferruginous area; propodeum often ferruginous apicolaterally; front and middle legs fulvoferruginous, sometimes with some weak infuscation, sometimes the front coxa mostly fuscous, their tarsi brownish apically and the basal 0.15 of their tibiae whitish; hind coxa, trochanters, and femur ferruginous, the apical 0.3± of the femur usually infuscate; hind tibia dark brown, its basal 0.2 white; hind basitarsus brown, its base and apex whitish; segments 2–4 of hind tarsus white; segment 5 of hind tarsus dark brown; segments 1–3 of abdomen ferruginous, the first sometimes a little infuscate basally; tergites 4–7 of abdomen black, the fourth often partly ferruginous laterally and the seventh with a median apical white spot.

Type: ♀, reared from cocoon of *Trichiosoma spicatum* Ithaca, N.Y., 1936, H. Townes (Washington, USNM 63753).

Paratypes (75♂, 73♀): From Alberta (Edmonton); British Columbia (Robson, and Scotch Creek near Celista); Colorado (Phantom Valley in Rocky Mountain National Park at 9,400 ft.); Idaho (Wallace); Maine (Northeast Harbor and Turner); Massachusetts (Cummington); Michigan (George Reserve in Livingston Co., Marquette Co., Midland Co., Ogemaw Co., and Osceola Co.); Minnesota (Plummer); New Jersey (Moorestown); New York (Bemus Point, Breesport, Ithaca, New Russia, Saranac Lake, and Syracuse); Ontario (Chalk River, Ignace, Merivale, and Ottawa); Quebec (Aylmer, Covey Hill, Montigny, Montreal, Quebec, and Sweetsburg); and Washington (Pullman and Yakima City).

The dates of collection are rather evenly distributed from early summer to early fall. The earliest and latest dates of collected specimens are: June 2 at Aylmer, Que., and September 6 at Robson, B.C. Specimens known or suspected to have been laboratory reared are recorded as early as March.

Reared lots include 4 rearings from *Trichiosoma triangulum*, 1 from *T. taylori*?, 1 from *Trichiosoma* sp., 2 from *Clavellarius americanus*, 1 from sawfly cocoon on *Crataegus*, 1 from sawfly cocoon on *Castanea*, 1 from gall on *Rosa*, and 1 from *Archips cerasivoranus*. It is presumed that the host records of a gall and *Archips* are errors and that the species normally parasitizes only clavellariid cocoons. About eight specimens, including both sexes, usually emerge from a single host cocoon. They cut several exit holes while emerging.

This subspecies is transcontinental in the Transition and Canadian zones.

3. Genus Gambrus

Figure 309,b

Kaltenbachia Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 187. Type: (*Cryptus ornatus* Gravenhorst) = *incubitor* (Linnaeus); designated by Viereck, 1914.

Gambrus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 188. Type: *Gambrus maculatus* Brischke; included by Brischke, 1888.

Hygrocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 513. Type: *Cryptus carnifex* Gravenhorst; designated by Viereck, 1914.

Allocryptus Viereck, 1917, Bull. Connecticut Geol. Nat. Hist. Survey, vol. 22, p. 333. Type: (*Agrothereutes* (*Allocryptus*) *hyslopi* Viereck) = *ultimus* (Cresson); monobasic.

Front wing 2.8 to 9.8 mm. long; flagellum of male sometimes with a pale median band or stripe; clypeus of moderate size, moderately convex, its apical margin convex, usually with a more or less distinct median apical lobe or blunt tooth; mesoscutum mat and with moderate sized or fine punctures; apical carina of propodeum complete, its median portion more or less bowed forward, its sublateral portion often forming a weak crest; areolet always subquadrate; ovipositor sheath 0.35 to 0.9 as long as front wing. Agrees otherwise with the generic description of *Agrothereutes*.

Gambrus is closely related to *Agrothereutes*, from which in our area it may be distinguished by the characters in the key. In Eurasia, however, are some apparently intermediate species and there the two genera cannot be satisfactorily separated. The distinction between *Gambrus* and *Aritranis* is also somewhat arbitrary, but easier and more natural than that between *Gambrus* and *Agrothereutes*. There are nine Nearctic species, and in Eurasia probably a larger number.

Keys to the Nearctic species of Gambrus

MALES

1. Femora entirely or largely black or fuscous 2
   Femora entirely or mostly ferruginous 3
2. Tergites 2–4 ferruginous, sparsely punctate . . . **3. tunicularubra** (Fyles)
   Tergites 2–4 black, densely punctate . . . . . **1. bituminosus** (Cushman)
3. Middle coxa partly or entirely whitish or stramineous; flagellum nearly always with a median white stripe above 4
   Middle coxa black or ferruginous; flagellum entirely blackish 6
4. Seventh tergite with a median apical white spot; hind basitarsus entirely white, or rarely a little infuscate . . . . **7. nuncius** (Say)
   Seventh tergite entirely black; hind basitarsus largely or entirely fuscous, rarely entirely white 5
5. Subapical tyloids narrow and sharp . . . . **8. extrematis** (Cresson)
   Subapical tyloids wide, about 0.28 as wide as their segments. **9. polyphemi** Townes

6. Front and middle coxae entirely ferruginous . . . . . 4. **ultimus** (Cresson)
Front and middle coxae partly or entirely black or fuscous 7
7. Segments 2 and 3 of maxillary palpus white . . . 6. **canadensis** (Provancher)
Segments 2 and 3 of maxillary palpus fuscous 8
8. Temple strongly convex; punctures on second tergite separated by about 2.5 their diameter; second tergite mostly or entirely ferruginous.
2. **apicatus** (Provancher)
Temple weakly convex; punctures on second tergite separated by about 1.0 their diameter; second tergite either black or ferruginous.
5. **yukonensis,** new species

FEMALES

1. Middle and hind coxae black 2
Middle and hind coxae ferruginous 4
2. Tergites 2 and 3 black; wings strongly infuscate; punctures on second tergite very dense . . . . 1. **bituminosus** (Cushman)
Tergites 2 and 3 ferruginous; wings subhyaline; punctures on second tergite very sparse 3
3. Femora ferruginous . . . . 2. **apicatus** (Provancher)
Femora fuscous . . . . 3. **tunicularubra** (Fyles)
4. Apex of lower valve of ovipositor with a well separated basal and apical set of teeth, its subapical teeth with both dorsal and ventral cusps (fig. 308,a)
9. **polyphemi** Townes
Apex of lower valve of ovipositor with a continuous single set of teeth, its subapical teeth without ventral cusps (figs. 327,k–o) 5
5. Front coxa entirely ferruginous; fourth tergite usually ferruginous or mostly so . . . . 4. **ultimus** (Cresson)
Front coxa largely or entirely fuscous; fourth tergite largely or entirely black 6
6. Apical margin of tergite 6 white; hind basitarsus entirely whitish or rarely with a weak subbasal infuscation . . . . 7. **nuncius** (Say)
Apical margin of tergite 6 not white; hind basitarsus mostly or entirely fuscous 7
7. Ovipositor sheath about 0.87 as long as front wing; segments 2–4 of hind tarsus whitish or mostly so . . . . 8. **extrematis** (Cresson)
Ovipositor sheath about 0.47 as long as front wing; segments 2–4 of hind tarsus fuscous 8
8. Tip of upper valve of ovipositor thick, its upper margin weakly scalloped (fig. 327,l); wrinkling on mesopleurum coarser . . . 5. **yukonensis,** new species
Tip of upper valve of ovipositor more slender, its upper margin simple or faintly scalloped (fig 327,m); wrinkling on mesopleurum finer.
6. **canadensis** (Provancher)

1. Gambrus bituminosus (Cushman)

FIGURE 327,i

Cryptoideus bituminosus Cushman, 1924, Proc. U.S. Nat. Mus., vol. 64, art. 4, p. 6; ♀. Type: ♀, Flushing, N.Y. (Washington).

Front wing 6.6 to 8.5 mm. long in male, 7.5 to 10.5 mm. long in female; clypeus rather short, moderately convex, with a very weak, blunt, median, apical tooth but the tooth appearing to be rather strong because the apex of clypeus is impressed on each side of it; temple moderately wide and convex; tyloids linear, sharp but rather weak, extending about 6 segments; mesoscutum strongly mat, with dense small but moderately strong punctures; mesopleurum with dense wrinkling that covers it with small polygonal cells that resemble punctures; second tergite weakly mat, with medium sized, strong, adjacent or subadjacent punctures; ovipositor sheath about 0.47 as long as front wing; ovipositor rather strongly compressed, its tip as in figure 327,i.

Head, body, and appendages uniformly black. Wings lightly infuscate in male, rather strongly infuscate in female.

One cocoon is at hand. It is elongate elliptic, almost cylindric with rounded ends, dense, opaque, with a little loose silk outside, and grey-brown in color.

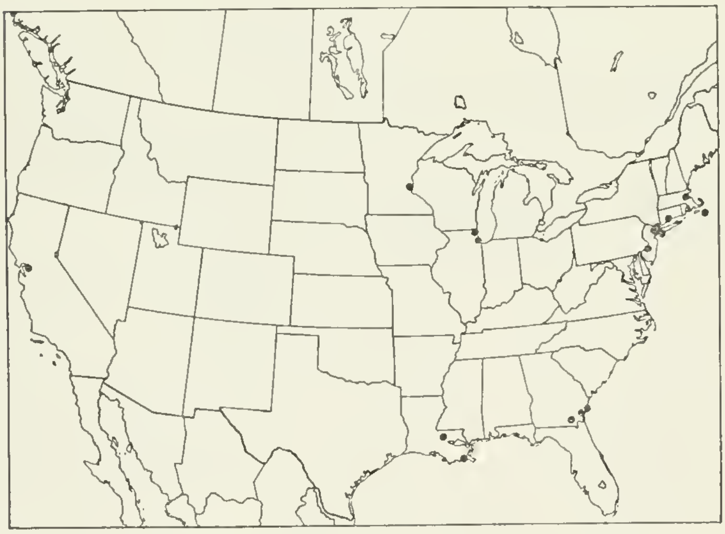


FIGURE 24.—Localities for *Gambrus bituminosus.*

This species is related to (*Hygrocryptus*) *Gambrus wadai* (Uchida) 1936, of Japan. It has no near relatives in America. *Gambrus wadai* is a new combination.

Specimens: ♀, Antioch, Calif., July 18, 1947, P. D. Hurd (Berkeley). ♀, Antioch, Calif., Aug. 6, 1955, E. S. Ross (San Francisco). ♂, ♀, reared from *Pyrausta nubilalis* in *Xanthium*, New Haven, Conn., June 16, 1938, N. J. Nerney (Washington). ♀, Billys Island, Okefenokee Swamp, Ga., June 1912 (Townes). ♀, Brunswick, Ga., May 2, 1911 (Townes). ♀, St. Simons Island, Ga., April 22 to May 12, 1911, J. C. Bradley (Ithaca). 2♀, reared from "*S. validus*," Beach in Lake Co., Ill., Aug. 14, 1929, Satterthwaite (Washington). ♂, Chicago, Ill., F. H. Chittenden (Washington). ♂, Baton Rouge, La., Jan. 13, 1923, T. H. Jones (Washington). ♀, reared from *Diatraea*, Grand Isle, La., Jan. 12, 1937, T. E. Holloway (Washington). ♂, ♀, reared from *Pyrausta nubilalis*, Belmont, Mass., July 15, 1957, W. A. Baker

(Washington). ♂, Nantucket, Mass., July 17, C. W. Johnson (Washington). ♀, Dr. Harvey's Farm, Washington Co., Minn., May 20, 1939, H. Knutson (St. Paul). ♂, reared from *Pyrausta nubilalis*, Burlington, N.J. (St. Paul). ♂, 2♀, Englewood, N.J., June 1918 (Washington). ♂, ♀, reared from *Calendra pertinax*, Flushing, N.Y., material collected October 13, 1919, emerged April 14–29, 1920 (Washington). ♂, Long Beach, Long Island, N.Y., July 17, 1927, F. M. Schott (Washington). ♀, in public stores, New York City, N.Y., Nov. 21, 1936 (Washington). ♀, West Farms, New York City, N.Y., J. Angus (Cambridge).

This species has been taken in widely separated spots in eastern United States and at Antioch, Calif. Most of the localities from which it is known are coastal, and it is suspected that the characteristic habitat is coarse marsh grass.

2. Gambrus apicatus (Provancher)

FIGURE 327,j

Cryptus apicatus Provancher, 1874, Naturaliste Canadien, vol. 6, pp. 178, 204; ♀. Lectotype: ♀, Que. (Quebec).

Cryptus cinctus Provancher, 1875, Naturaliste Canadien, vol. 7, pp. 175, 177; ♂. Name preoccupied by Fabricius, 1804. Lectotype: ♂, Que. (Quebec).

Front wing 4.7 to 8.0 mm. long; clypeus rather short, rather weakly convex, with a very weak, blunt, median apical tooth, but the tooth appearing to be rather strong because apical part of clypeus is impressed on each side of it; temple full, strongly convex; tyloids linear, sharp, moderately strong, extending about 5 segments; mesoscutum mat marginally and near notauli, the rest subpolished, its punctures small, weak, separated by about 1.5 their diameter; mesopleurum polished, with moderate-sized punctures that are separated by about 1.5 their diameter, but on much of median part of mesopleurum the punctures obscured by wrinkling; first tergite exceptionally short; second tergite of male moderately mat, with small weak punctures that are separated by about 2.5 their diameter; second tergite of female subpolished, with fine, weak, very sparse punctures; ovipositor sheath about 0.37 as long as front wing; ovipositor strongly compressed, its tip as in figure 327,j.

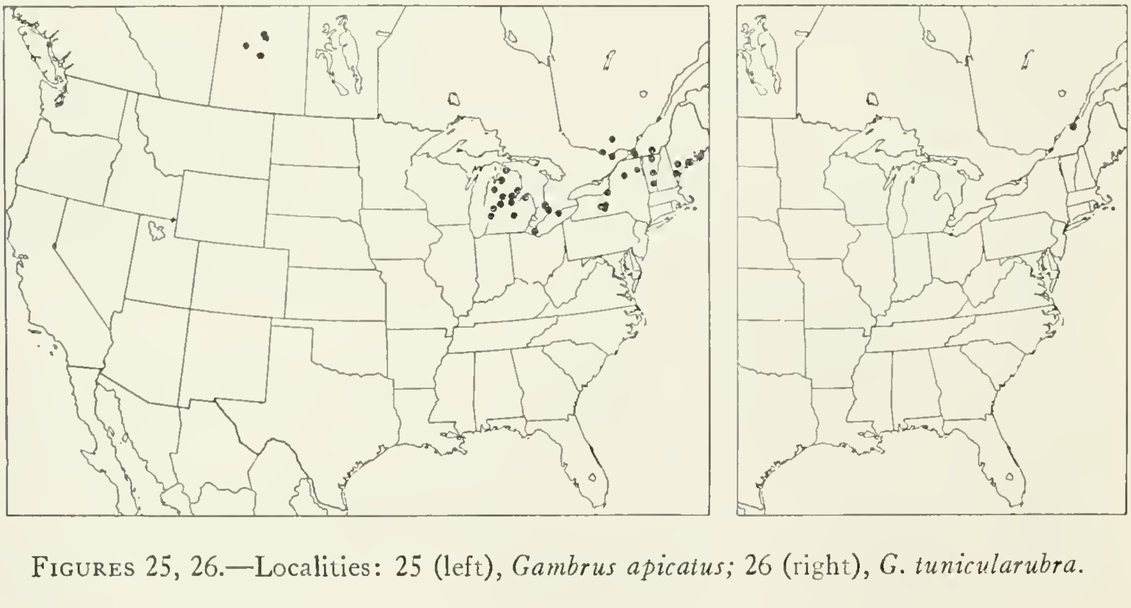
Black. Palpi and tegula fuscous or black; front and middle legs beyond first trochanters ferruginous, the apex of their fifth tarsal segments brownish; hind second trochanter, femur, and tibia ferruginous, the apical 0.12± of the femur and tibia infuscate; hind tarsus ferruginous brown or fuscous, each segment a little paler at the base; wings faintly infuscate; extreme apex of male first tergite and apical 0.3± of female first tergite ferruginous; second and third tergites ferruginous, in the male the second tergite sometimes and third tergite rarely with a median subapical transverse fuscous area; fourth tergite of male usually ferruginous basally, sometimes mostly ferruginous; fourth tergite of female usually entirely black but sometimes ferruginous basally; seventh tergite of female with a rather narrow median white stripe.

Specimens (32♂, 58♀): From Maine (Bar Harbor, Belfast, Casco, Lincoln Co., and Winthrop); Michigan (Bay Co., Douglas Lake, Gladwin Co., Huron Co., Iosco Co., Isabella Co., Midland Co., Muskegon, Newaygo Co., Otsego Co., Saginaw Co., and Wexford Co.); New York (Adirondack Mts., Ithaca, Lake Placid, McLean Bogs Reserve, Michigan Hollow Swamp in Tompkins Co., and Oswego); Nova Scotia (Baddeck and Petite Riviere [Bridge]); Ohio (Put-in-Bay); Ontario (Dow's Swamp near Ottawa, Grand Bend, London, and Parr Island in East Spence Lake); Quebec (Abbotsford, Knowlton, Lac Brule, and Norway Bay); Saskatchewan (Dundurn, Prince Albert National Forest, Redberry, and Waskesiu [Lake]); and Vermont (Ascutney, Newport, and Woodstock).

Dates of collection are from late spring to early fall, with most of them in July and August. The earliest and latest dates are: May 16 at Dundurn, Sask.; May 30 in Saginaw Co., Mich.; August 23 in Michigan Swamp, Tompkins Co., N.Y.; August 29 in Lincoln Co., Maine; and September 18 to 20 at Belfast, Maine.

Reared specimens are as follows: ♀, from *Salix* gall, London, Ont., Apr. 2, 1953, W. W. Judd. ♀, reared probably from *Euura* gall on white willow, at St. Paul, Minn., Jan. 27, 1908.

This species ranges from Maine to Alberta, in the Transition and Canadian zones. It appears to be parasitic on sawfly galls on *Salix*.



FIGURES 25, 26.—Localities: 25 (left), *Gambrus apicatus;* 26 (right), *G. tunicularubra.*

3. Gambrus tuniculàrubra (Fyles)

Trychosis tunicula-rubra Fyles, 1896, Canadian Ent., vol. 28, pp. 148–150; ♂, ♀. Lectotype (hereby designated): ♀, Levis, Que. (Washington).

Biology: Fyles, 1896, Canadian Ent., vol. 28, pp. 148–150.

Male: Unknown to us, described by Fyles as follows:

> General appearance darker and less robust than that of the female. Antennae dark brown, nearly black, twenty-six joints in the flagellum, the first being five times as long as thick; eyes prominent, brown; ocelli black; palpi five-jointed, brown; coxae black, hairy and punctured—the hindermost pair unusually large; first pair of legs ferruginous; the rest fuliginous, with knees of a lighter colour; tibial spurs stout; wings smoky; abdomen long and slender; petiole black, extended, horn-shaped; three following segments red, the first and third edged with black; the rest of abdomen black.

Female: Front wing 4.9 mm. long. Structure similar to that of *G. ultimus* except that lower half of temple is polished, mesoscutum is not so strongly mat and a little less densely punctate, and teeth on lower valve of ovipositor a little closer together.

Black: Femora brownish fuscous; tibiae and tarsi brown; latero-apical part of first abdominal segments and all of segments 2 and 3 ferruginous.

Redescribed from the lectotype, a female labeled: "So. Quebec, Can. ex *Gelechia g.-diplopappi*, T. W. Fyles Coll." (Washington).

This species was reared from *Gnorimoschema gallaeasteriella* in Quebec, over 60 years ago. It has not been found again.

4. Gambrus ultimus (Cresson)

Figure 327,k

Cryptus ultimus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 305; ♀. Type: ♀, Colorado (Philadelphia).

Cryptus incertus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 306; ♀. Name preoccupied by Ratzeburg, 1852. Type: ♀, Delaware (Philadelphia).

Phygadeuon longicornis Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 52; ♀. Type; ♀, Ottawa, Ont. (Ottawa).

Hemiteles annulicornis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 403; ♀. Type: ♀, Texas (Washington).

Agrothereutes (*Allocryptus*) *hyslopi* Viereck, 1917, Bull. Connecticut Geol. Nat. Hist. Survey, vol. 22, p. 333; [♀]. Type: ♀, Stonington, Conn. (New Haven, Connecticut Agr. Exp. Sta.).

Spilocryptus exannulatus Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 529; ♂, ♀. Type: ♀, North East, Pa. (Washington).

Hoplocryptus incertulus Cushman, 1925, Journ. Washington Acad. Sci., vol. 15, p. 390. New name for *C. incertus*.

Biology: Fink, 1932, Jour. Agr. Res., vol. 44, pp. 555, 556.—Haden, 1935, Bull. Univ. Delaware Agr. Exp. Sta., No. 194, pp. 33–35.

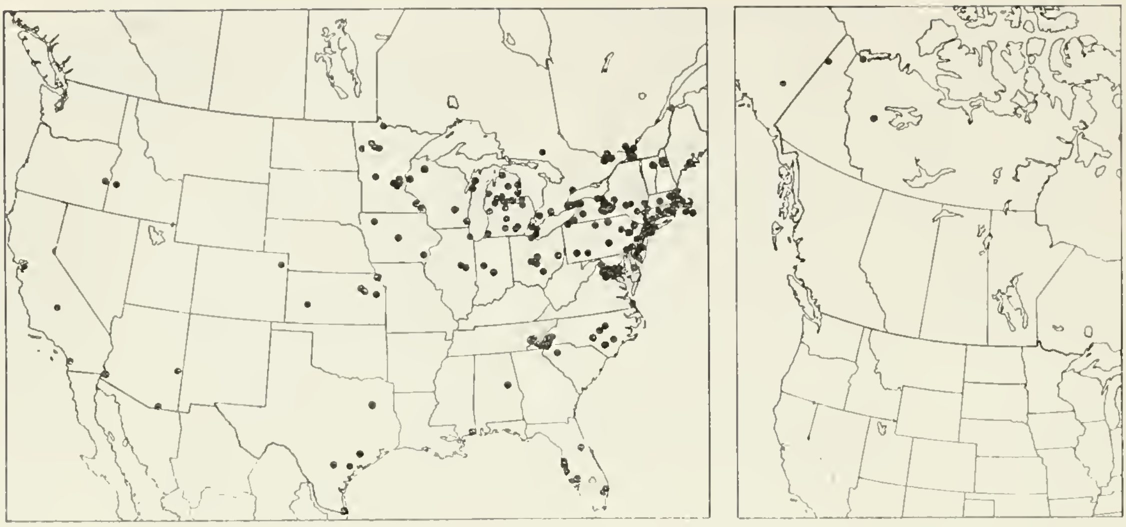
Front wing 2.8 to 7.3 mm. long; clypeus moderately large, moderately convex, its apical part somewhat impressed, its apical margin with a broad, weak, rounded median tooth that is a little accentuated by impressions on each side of it; temple narrow, weakly convex; tyloids linear, sharp, extending about 5 segments; mesoscutum strongly mat, with medium-sized, weak punctures that are separated by about 1.3 their diameter; mesopleurum polished, with coarse, close punctures and close reticulate wrinkling that in most areas replaces the punctures; second tergite of male strongly mat on its basal 0.7±, the rest less strongly mat, its punctures rather large, weak, separated by about 0.6 their diameter; second tergite of female weakly mat, its apical 0.3± subpolished, on its basal 0.7± with medium-sized weak punctures that are separated by about 2.5 their diameter, elsewhere almost impunctate; ovipositor sheath about 0.47 as long as front wing; ovipositor moderately compressed, its tip as in figure 327,k.

Black. Mandible partly ferruginous; maxillary palpus of male whitish to dark brown; labial palpus of male dark brown; both palpi of female dusky brown; flagellum of female brown basally, usually with a median short white stripe above, extending about 4 segments; tegula fulvous, ferruginous, or brown; front and middle legs ferruginous, their tarsi usually dusky apically, especially the middle tarsus; hind coxa, trochanters, and femur ferruginous, the apical 0.12± of the femur fuscous; hind tibia dusky ferruginous, its apical 0.15± infuscate; hind tarsus of male dusky brown, paler at the incisures, the third segment and basal half of fourth often white; hind tarsus of female ferruginous brown, the segments paler basally; wings subhyaline or weakly infuscate; first four segments of abdomen fulvoferruginous, or the fourth segment sometimes more or less fuscous; fifth tergite often fulvoferruginous basally; seventh tergite of female with a moderately large median white spot. In some dwarf males the second and third tergites are partly infuscate. Some specimens from California have less than the normal amount of fuscous on the apex of the hind femur.

The cocoon is elongate oval, thin, white, and with considerable loose white silk on the outside. It is spun normally outside of the host remains.

Specimens (323♂, 349♀): From Alabama (Coleta); Arizona (near Alpine, Sunnyside Canyon in Huachuca Mts., and Yuma); California (Fresno Co., La Jolla, Oakland, and "Sentenac Canyon" in San Diego Co.); Colorado (Yuma); Connecticut (Cheshire, Farmington, Lebanon, Redding, Salem, and Sterling); Delaware (Bridgeville); District of Columbia (River Terrace); Florida (Bradenton, Charlotte Harbor, Englewood, Larkins in Dade Co., Lutz, Pasadena in Pinellas Co., Punta Gorda, Sanford, and South Miami); Hawaii (Koku on Kauai and Maunaloa Trail on Kilauea); Idaho (3 miles north of Middleton in Canyon Co.); Illinois (Grays Siding, Lake Forest, and Urbana);

Indiana (Lafayette and Lapel); Iowa (Ames, Henry Co., and Ruthven); Kansas (Baldwin, Blair, Cimarron, Riley Co., and Wamego); Maine ("Carrs" and Lincoln Co.); Maryland (Bowie, Chesapeake Beach, Hall, Patuxent Refuge near Bowie, Plummers Island, and Takoma Park); Massachusetts (Arlington, Blue Hills, Boston, Carlisle, Holliston, Hyannisport, Martha's Vineyard, Milton, Nantucket, Saugus, South Hadley, Wellesley, and Weymouth); Michigan (Alcona Co., Ann Arbor, Bay Co., Clare Co., Douglas Lake, East Lansing, Gratiot Co., Iosco Co., Isabella Co., Jackson Co., Manistee Co., Mecosta Co., Midland Co., Muskegon Co., Osceola Co., Roscommon, Saginaw Forest near Ann Arbor, Sand Point in Huron Co., Tuscola Co., and Warren Dunes in Berrien Co.); Minnesota (Bagley, Fort Snelling, Houston Co., Itasca Park, Lake Itasca, New Brighton, Norman Co., Pitt, St. Paul, Sedan, Winona Co., and Wyoming); Mississippi (Biloxi); New Hampshire (Lakes of the Clouds on Mount Washington at 5,100 ft., Pinkham Notch, and Randolph); New Jersey (Bridgeton, Edgewater, Menantico in Cumberland Co., Moorestown, New Brunswick, New Lisbon, Riverton, "Strawberry Beds in southern New Jersey," and Trenton); New York (Babylon, Barrytown, Castile, Chatham, Chautauqua Co., Cold Spring Harbor, Connecticut Hill near Trumbull Corner at 2,095 ft., Copake Falls, Farmingdale, Floral Park, Geneva, Hunter, Ithaca, Long Beach, Ludlowville, McLean Bogs in Tompkins Co., "Moss Pond" in Essex Co., North Fairhaven, Nyack, Oneonta, swamp near Oneonta at 1,900 ft., Oswego, Peekskill, Poughkeepsie, Rockaway, Rome, South Hill near Ithaca, Spring Lake in Cayuga Co., Taughannock Falls, Washington Heights in New York City, and Youngstown); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Devil's Court House on Blue Ridge Parkway, Elizabethtown, Faison, Franklin at 2,000 ft., Hamrick, Highlands at 3,800 ft., Mount Mitchell at 4,000 to 6,000 ft. and at 6,400 ft., Raleigh, Southern Pines, and Wake Forest); Nova Scotia (Baddeck and White Point Beach in Queens Co.); Ohio (Big Walnut Creek near Columbus, Cedar Point, Columbus, Hocking Co., Jug Run near Smithfield, Put-in-Bay, and Worthington Township); Ontario (Coniston, Harrow, Ingersoll, Jordan, Kinburn, Ottawa, Point Pelee, Strathroy, Swansea near Toronto, Vineland, and Vineland Station); Oregon (Adrian); Pennsylvania (Bartonsville, Dormont, Inglenook in Dauphin Co., Ligonier, Lincoln University, Mansfield, Milford, North East, Spring Brook, Swarthmore, and Wilawana); Quebec (Hemmingford, La Trappe, Laval Co., Norway Bay, Parke Reserve in Kamouraska Co. at 950 ft., Saint Hilaire, and Shawbridge); Rhode Island (Providence and Westerly); South Carolina (Greenville); Tennessee (The Chimneys in Great Smoky Mountains National Park and Clingmans Dome



Figures 27, 28.—Localities: 27 (left), *Gambrus ultimus;* 28 (right), *G. yukonensis.*

in Great Smoky Mountains National Park at 6,600 ft.); Texas (Brownsville, Hopkins Co., San Antonio, Victoria, and Wharton); Vermont (Caledonia Co.); Virginia (Arlington, Cape Henry, Chain Bridge, Falls Church, Glencarlyn, Great Falls, "Middle Mt." at 4,000 ft., and Vienna); West Virginia (Bolivar); and Wisconsin (Casco, Columbus, Door Co., Polk Co., Racine, and Sawyer Co.).

Collection dates are distributed from mid-spring to mid-fall. Unusually early and late dates are: March 7 at 12 miles southwest of Bakersfield, Calif.; March 21 at Tarpon Springs, Fla.; March 23 at Brownsville, Tex.; March 27 in Sentenac Canyon, San Diego Co., Calif.; April 2 at Punta Gorda, Fla.; April 4 at San Antonio, Tex.; April 8 at Cape Henry, Va.; April 15 at Cimarron, Kans.; April 17 at Vienna, Va.; April 23 in Wake Co., N.C.; April 29 at Columbus, Ohio; April 29 and May 1 in Hennepin Co., Minn.; May 4 at Dormont, Pa., and at Milton, Mass.; May 10 and 11 at Ithaca, N.Y.; May 13 at Ann Arbor, Mich.; September 30 at Strathroy, Ont.; October 10 at Wellesley, Mass.; October 11 at Ann Arbor, Mich.; October 20 and 21 at Takoma Park, Md.; October 22 at New Lisbon, N.J.; October 25 at Davis, Calif., and in Fresno Co., Calif.; October 27 at Hall, Md., and at Columbus, Wis.; November 7 at Ithaca, N.Y.; and November 11 in Hopkins Co., Tex.

There are many rearing records on pin labels, which are as follows: 9 rearings or reared lots from *Ancylis comptana*, 4 from *Grapholitha molesta*, 3 from *Polychrosis viteana*, 2 from *Pyrausta nubilalis*, and 1 each from *Coleophora* sp. on *Aster*, *Eurukuttarus confederatus*, *Exyra semicrocea*, *Hypera brunneipennis*, *Hyaloscotes sheppardi*, *Loxostege sticticalis*, *Pachyzanchla bipunctalis*, *Phlyctaenia tertialis*, *Simyra henrici*, *Trichoplusia ni*, *Udea rubigalis*, "bagworm," "cranberry moth," and "uva-ursa fire-worm." Notes on the pin labels of three specimens state that the parasite cocoon was spun outside the pupal shell of the host.

In our own collecting we find the species among low herbage and grass along roadsides, edges of woods, and overgrown fields. Its occurrence in this habitat explains why it is so often reared in studies on economic insects.

This species occurs over most of the United States and southern Canada. It is more common in the East than in the West.

5. Gambrus yukonensis, new species

Figure 327,l

Front wing 4.0 to 7.4 mm. long; general structure as in *G. ultimus* except that clypeus is a little more convex, sculpture more strongly mat, wrinkling on mesopleurum stronger, coarser, and more reticulate, punctures on second tergite of male a little stronger and closer, second tergite of female mat all over and with more evenly distributed, medium-sized, moderately strong punctures that are separated by about 1.5 their diameter, and especially that the tip of upper valve of ovipositor is thicker and has a distinctly scalloped upper margin (fig. 327,l).

Male: Black. Palpi fuscous; tegula black; front and middle legs beyond trochanters ferruginous, their tarsi somewhat infuscate and often the front femur infuscate basally; hind second trochanter and femur ferruginous, the apical 0.2± of the femur black; hind tibia brown, fuscous apically; hind tarsus fuscous brown, the first three segments pale at base; wings faintly infuscate; abdomen black with apical margin of tergites 2 and 3 ferruginous, or tergites 2–4 and apex of first tergite more or less ferruginous.

Female: Black, including the palpi, flagellum and tegula. Front and middle legs ferruginous, some or all of front coxa, usually more or less of front trochanters, and sometimes base of front femur, fuscous, their tarsi more or less infuscate and their tibiae often tinged with fuscous; hind coxa, trochanters, and femur ferruginous, the apical 0.15 to 0.3 of the femur fuscous; hind tibia fuscous, tinged with reddish brown; hind tarsus fuscous, paler at the joints; abdomen black with apical margin of tergite 2 ferruginous, or the second, third, and apical 0.4± of first tergite partly or entirely ferruginous.

Type: ♀, Rampart House, Yukon, July 31, 1951, J. E. H. Martin (Ottawa).

Paratypes: ♂, Big Delta, Alaska, July 3, 1951, W. R. M. Mason (Ottawa). 5♂, 4♀, Norman Wells, N. W. T., June 21, 22, 27, 29, 1949, and July 3, 4, 9, 21, 1949, W. R. M. Mason (Ottawa). ♀, Reindeer Depot, Mackenzie Delta, N. W. T., July 6, 1948, W. J. Brown (Ottawa). 3♂, Rampart House, Yukon, June 17, 1951, and July 19 and 27, 1951, J. E. H. Martin (Ottawa).

6. Gambrus canadensis (Provancher)

FIGURE 327,m

Front wing 3.8 to 7.4 mm. long; clypeus moderately large, moderately convex, but in the subspecies *burkei* the clypeus a little smaller and more strongly convex; apical margin of clypeus without a distinct median apical tooth, but impressed on each side so that it may seem to have a broad, weak median tooth; temple rather strongly convex, but in the subspecies *burkei* the temple rather weakly convex; tyloids linear, sharp, extending for about 5 segments; mesoscutum mat, or partly subpolished; mesopleurum polished with some rather coarse punctures but mostly with reticulate wrinkling that obscures or replaces the punctures; second tergite of male weakly mat, with rather large, shallow punctures that are separated by about 0.6 their diameter; second tergite of female mat, its apical 0.35± usually less strongly mat, with moderate sized, rather shallow punctures that are separated by about 0.5 to 3.0 their diameter; ovipositor sheath about 0.44 as long as front wing; ovipositor moderately compressed, its tip as in figure 327,m.

This species is transcontinental in the Transition and Canadian zones. It occurs in the undergrowth of deciduous woods and normally parasitizes *Malacosoma* spp. There are three subspecies, as keyed and described below:

1. Apical 0.1 to 0.25 of hind femur fuscous; flagellum of female with a short median white stripe above; seventh tergite of female nearly always with a median white spot; range: Atlantic Ocean to Rocky Mountains in Canadian and Transition zones, plus Alberta, British Columbia, and parts of Washington and Oregon . . . . **6a. canadensis canadensis** (Provancher)
   Apical part of hind femur not distinctly infuscate; flagellum of female usually without a median white stripe; seventh tergite of female usually without a white spot 2
2. Temple rather strongly convex; first trochanter of middle and hind legs of male fuscous; range: Rocky Mountain area, from Washington to Arizona and New Mexico . . . . **6b. canadensis exareolatus** (Viereck)
   Temple rather weakly convex; first trochanter of middle and hind leg of male ferruginous or mostly so; range: California.
   6c. canadensis burkei (Viereck)

6a. Gambrus canadensis canadensis (Provancher)

Nematopodius Canadensis Provancher, 1875, Naturaliste Canadien, vol. 7, p. 268; ♂. Lectotype: ♂, Que. (Quebec).

Clypeus rather wide; temple rather strongly convex; mesoscutum mat.

Male: Black. Maxillary palpus white, its first segment black and its last two more or less infuscate; labial palpus fuscous; tegula black; front and middle legs beyond first trochanters ferruginous; hind

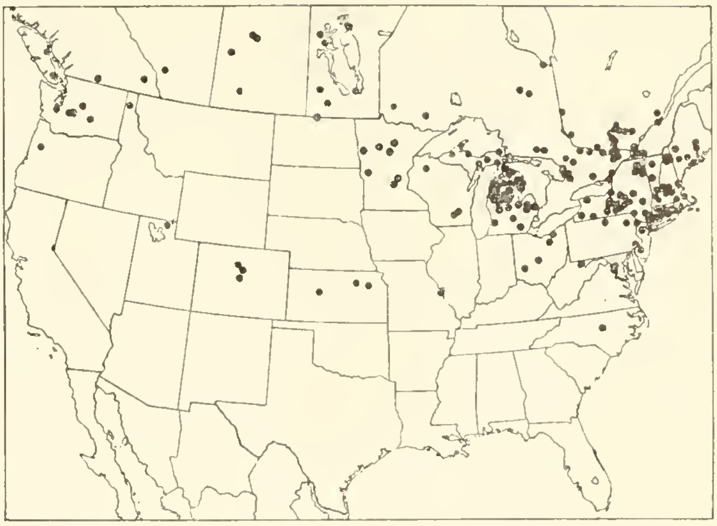


FIGURE 29.—Localities for *Gambrus canadensis canadensis.*

second trochanter, femur, and tibia ferruginous, the apical 0.12 to 0.25 of femur fuscous, the tibia darkened apically, its apical 0.2± fuscous; hind tarsus fuscous, its segments 2–4 and sometimes part of segment 1, white; wings subhyaline; first abdominal segment ferruginous, more or less infuscate basally; tergites 2–4 ferruginous. Rarely tergite 7 has a small median white spot and rarely the flagellum has an obscure median whitish stripe above that covers several segments. Males with the terminal white spot are from Bangor, Maine, and Westerly, R.I. Males with the whitish mark on flagellum are from Franconia and Mount Washington, N.H., from Mount Desert, Maine, and from Go Home Bay, Ont. Sometimes segment 2 of the male hind tarsus is more or less infuscate.

Female: Black. Palpi fuscous; flagellum with an incomplete white band that covers about 4 segments; tegula black; front coxa and first trochanter entirely or largely fuscous, sometimes mostly ferruginous with some parts infuscate; front leg beyond second trochanter and entire second leg, ferruginous, the middle tarsus weakly infuscate apically; hind coxa, trochanters, and femur ferruginous, the apical 0.12 to 0.25 of the femur fuscous; hind tibia fuscoferruginous, darker apically and at base; hind tarsus brown or fuscous, paler at the joints, the third segment often white or partly white; wings faintly infuscate; abdominal segments 1–3 ferruginous, the base of first segment fuscous; tergite 7 with a moderately large median white spot, or in specimens from the border of the range of the subspecies *exareolatus* the white spot often small or absent.

The cocoon is elliptic, of moderate length, thin but dense, and with a felt of loose silk on the outside. The color ranges from white to gray-brown.

Specimens (286♂, 262♀): From Alaska (Mile 25 on Richardson Hwy.); Alberta (near Rocky Mountain House); British Columbia (Columbia on Carbonate River at 2,600 ft., Duncan, Miracle Beach near Oyster River, and Oliver); Colorado (near Estes Park, Idaho Springs, and Lyons); Connecticut (Colebrook, Collinsville, Connecticut riverbank at East Hartford, East Haddam, Green Falls, Portland, Redding, Stamford, and Wallingford); Idaho (Priest Lake and 11 miles north of "W. Springs"); Kansas (Lawrence, Riley Co., and Russell Co. at 1,830 ft.); Maine (Augusta, Bangor, Lincoln Co., Livermore Falls, Mount Desert, Oquossoc, and Orono); Manitoba (Aweme, Cedar Lake, Norway House, The Pas, Riding Mountain National Park, and Teulon); Maryland (Takoma Park); Massachusetts (Chester, Greenfield, Holliston, Minot, Mount Greylock, and Winchendon); Michigan (Adrian, Alcona Co., Antrim Co., Baraga Co., Clare Co., Delta Co., Douglas Lake, Flat River Game Area in Montcalm Co., George Reserve in Livingston Co., Gladwin Co., Grand Traverse Co., Gratiot Co., Houghton, Houghton Lake in Roscommon Co., Hunt Creek Experiment Station near Lewiston, Iosco Co., Isabella Co., Kalkaska Co., Kingston, 13 miles north of Lapeer, Leelanau Co., Manistee Co., Mason Co., Mecosta Co., Midland Co., Mio, Montcalm Co., Naubinway, Newaygo Co., Ogemaw Co., Ontonagon Co., Osceola Co., Otsego Co., Presque Isle Co., Roscommon, Rudyard, Saginaw Co., Sanilac Co., Schoolcraft Co., Van Buren Co., Wexford Co., Whitefish Point, and Wycamp Creek 3 miles north of Cross Village); Minnesota (Cass Co., Hennepin Co., Itasca Co., Itasca Park, Norman Co., Traverse Co., and Zumbra Heights in Carver Co.); Missouri (Overland); New Hampshire (Base Station on Mount Washington, Cragway Springs on Mount Washington at 4,700 ft., Durham, The Flume, Franconia, Jaffrey, Keene, and Pinkham Notch); New Jersey (Fort Lee, "Lahaway" in Ocean Co., Lake Hopatcong, and Moorestown); New York (Bemus Point, Breesport, Canadarago Lake, Canajoharie, Connecticut Hill near Trumbull Corner at 2,095 ft., Dix Hills on Long Island, Elizabethtown, Frontenac Point on Cayuga Lake, Greene Co., Hague, Hancock, Ithaca, Lockport, McLean, McLean Bogs in Tompkins Co., top of Mount Marcy, top of Mount Whiteface, New Berlin, Oneonta, swamp near Oneonta at 1,900 ft., Oswego, Peekskill, Poughkeepsie, Ringwood in Tompkins Co., Rock City in Cattaraugus Co., Shokan, Six Mile Creek near Ithaca, Slaterville, South Adirondacks, Stratford, Taughannock Falls, Thousand Islands, and Watson); North Carolina (Wake Co.); North Dakota (Turtle Mts.); Nova Scotia (Smith's Cove); Ohio (Barberton, Columbus, Montgomery Co., and Puritas Springs in Cuyahoga Co.); Ontario (Chalk River, Cochrane, Coniston, Flanders, Gananoque, Go Home Bay, Gravenhurst in the Muskoka District, Island Falls Junction, Moose Factory, Orillia, Ottawa, Petawawa National Forest near Chalk River, Pakesley near Parry Sound, Rockcliffe near Ottawa, "Salines," Sioux Narrows, Smoky Falls on Mattagami River, South

River, Spider Bay near Georgian Bay, Sudbury, and Tweed); Oregon (Corvallis); Pennsylvania (Philadelphia, Pike Co., Spring Brook, and Tioga Co.); Quebec (Aylmer, Brome, Burbridge, Fort Coulonge, Gracefield, Kazabazua, Knowlton, Lac Mercier, Lacosta, Lake Opasatika, Laniel, "Larkin," Maniwaki, Montigny, Montreal, Nominingue, Norway Bay, Quebec, Queens Park near Aylmer, Sainte-Agathe-des-Monts, Stoneham, and Sweetsburg); Rhode Island (Charlestown and Westerly); Saskatchewan (Attons Lake near Cut Knife, Prince Albert National Park, 5 miles east of Swift Current, and Waskesiu Lake); Utah (Logan Canyon in Cache Co.); Vermont (Laurel Lake near Jacksonville, Rutland, and Stowe); Virginia (Falls Church); Washington (Ashford, Easton, Mount Rainier at 2,700 ft., Olympia, and Yakima); West Virginia (Terra Alta); and Wisconsin (Columbus, Madison, and Sawyer Co.).

Most collection dates are in the summer months. The span of May 25 to September 15 will include nearly all of them. The earliest and latest dates on record are: April 20 and 23 in Wake Co., N.C.; May 10 in Osceola Co., Mich.; May 14 in the Flat River Game Area, Montcalm Co., Mich.; May 15 at Spring Brook, Pa.; May 17 and 20 at Ithaca, N.Y.; May 20 and 21 at Jaffrey, N.H.; May 21 in Itasca Park, Minn., and at Houghton Lake, Roscommon Co., Mich.; May 23 and 24 in Clare Co., Mich.; September 16 in Montcalm Co., Mich.; September 24 at Aylmer, Que.; October 2 at Collinsville, Conn.; October 9 at Ithaca, N.Y.; October 29 in Gladwin Co., Mich.; and December 6 at Overland, Mo.

Host records on pin labels include the following reared specimens or reared lots: 8 from *Malacosoma disstria*, 5 from *M. americanum*, 5 from *Malacosoma* sp., 1 from *Carpocapsa pomonella*, and 1 from a tenthredinid. The reared lots indicate that on *Malacosoma* there are usually 4 to 10 parasites per host cocoon, including either one or both sexes.

This subspecies occurs in the Carolinian and Alleghanian faunas, is transcontinental in southern Canada, and is locally present in northwestern United States.

6b. Gambrus canadensis exareolatus (Viereck), new status

Spilocryptus exareolatus Viereck, 1903, Trans. Amer. Ent. Soc., vol. 29, p. 81; ♂. Type: ♂, Beulah, N. Mex. (Philadelphia).

Clypeus rather wide; temple moderately convex; mesoscutum mostly mat but the central part of its lateral lobes polished or subpolished.

Colored as in the subspecies *canadensis* except that female flagellum lacks a white band or has only a short dorsal white stripe that covers 2–4 segments, apex of hind femur is not at all or only faintly infuscate, and female seventh tergite usually lacks the median white spot. In the male the first segment of hind tarsus is always fuscous and usually the second segment is also fuscous.

Specimens (24♂, 38♀): From Alberta (Waterton); Arizona (near Alpine, Flagstaff, Oak Creek Canyon, and Springerville at 9,200 ft.); Colorado (near Boulder Creek in Boulder Co., near Estes Park, Phantom Valley in Rocky Mountain National Park at 9,400 ft., Pikes Peak, Rabbit Ears Pass at 9,500 ft., Steamboat Springs, and Ward); Idaho (Oakley); Minnesota (Ramsey Co. and St. Anthony Park); Montana (Swift Current in Glacier National Park); New Mexico (Beulah at 8,000 ft., Cimarron Canyon in Colfax Co., Hondo Canyon in Taos Co., and near Santa Fe); Saskatchewan (Pike Lake); Utah (Vernal Canyon in Unitah Mts.); Washington (Olympia and Pullman); and Wyoming (Centennial at 8,000 ft.).

Most collection dates are from June 12 to August 18. Those outside of this range are: May 17 in Oak Creek Canyon, Ariz.; May 24, 25, 26, 28, and 29 near Alpine, Ariz.; May 30 at Pike Lake, Sask.; August 20 at Springerville, 9,200 ft., Ariz.; and September 18 at Pullman, Wash.

Rearing records are as follows: ♀, from *Malacosmoa fragile*, Flagstaff, Ariz., C. F. Karstein. ♀, from *Malocosoma fragile*, Pikes Peak, Colo., July 18, 1900. 2♀, from *Malocosoma* sp., near Santa Fe, N. Mex., N. R. Appleton.

This subspecies occurs in the Rocky Moutain area, and locally in Minnesota.

6c. Gambrus canadensis burkei (Viereck), new status

Cryptus (*Gambrus*) *burkei* Viereck, 1909, Ent. News, vol. 20, p. 291; ♂, ♀. Lectotype (hereby designated): ♀, Summerdale, Calif. (Washington).

Clypeus a little narrower and more convex than in the other two subspecies; temple rather weakly convex; mesoscutum largely polished or subpolished, mat near the notauli and margins; second tergite of female usually less densely punctate than in the other two subspecies.

Male: Similar in coloration to the subspecies *canadensis* except that middle and hind first trochanters are ferruginous or mostly so, middle and hind coxae are often ferruginous apically or sometimes mostly ferruginous with their bases infuscate, apex of hind femur is not fuscous, and fuscous areas on hind tibia and tarsus are paler.

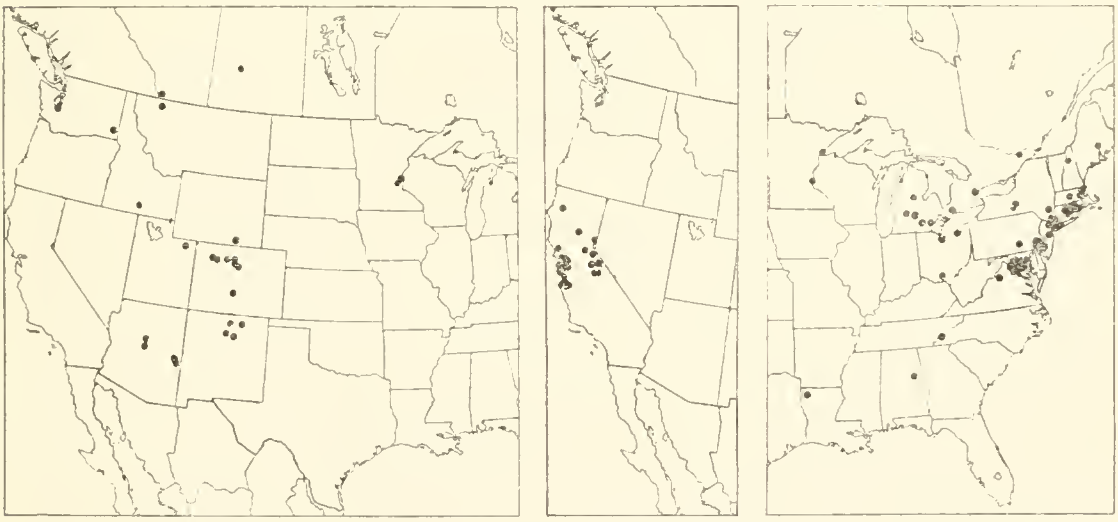
Female: Similar in coloration to the subspecies *exareolatus* except that flagellum and seventh tergite are never marked with white.

Specimens (10♂, 27♀): From California (Alameda, between Arroyo Seco and Carmel in Monterey Co., Berkeley, Big Bend Mt. in Butte Co., Boca in Nevada Co., Camino, Carmel, Carson Pass at 8,000 ft., Crane Flat in Yosemite Park, Dardenelle, Forestville, Hastings Natural History Reserve at Jamesburg in Santa Lucia Mts. in Monterey Co. at 1,900 to 2,700 ft., Hayward, Mono National Forest [=Tioyabe National Forest], Monterey, Mountain View, Niles Canyon, hills back of Oakland, Palo Alto, Santa Clara Valley, Santa Cruz Mts., near Sonora Pass at 8,000 ft., Trinity Co. at 6,000 ft., Watsonville, and Yosemite Valley).

Most of the collection dates are from May 20 to August 10. Those outside of this range are: April 20 in Niles Canyon, Calif.; May 8 at Big Bend Mountain, Butte Co., Calif.; September 2 at Carson Pass, 8,000 ft., Calif.; and September 28 at Hayward, Calif.

Reared specimens are as follows: 2♂, 1♀, from *Malacosoma californicum*, Berkeley, Calif., June 7 and 10, 1907. ♀, from *Hemerocampa vetusa*, Hayward, Calif., Sept. 28, 1921, C. T. Dodds. ♀, from *Hemerocampa vetusa*, Watsonville, Calif., June 20, 1907. 2♀, from *Hemerocampa oslari*, Mono National Forest, Calif., D. Deleon. ♀, from "tussock moth," Santa Clara Valley, Calif., June, W. M. Davidson. ♀, from *Phloeosinus punctatus*, Yosemite Valley, Calif., June 19, 1918, J. E. Patterson. The record from *Phloeosinus punctatus* is probably incorrect.

This subspecies occurs in California.



FIGURES 30–32.—Localities: 30, (left), *Gambrus canadensis exareolatus;* 31 (center), *G. c. burkei;* 32 (right), *G. nuncius.*

7. Gambrus nuncius (Say)

FIGURE 327,n

Cryptus nuncius Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 237 (Leconte ed., vol. 2, p. 693); ♀. Type: ♀, Pennsylvania (destroyed).

BIOLOGY: Schaffner and Griswold, 1934, Misc. Pub. U.S. Dep. Agr., No. 188, p. 141.

Front wing 5.1 to 9.5 mm. long; similar in structure to *G. polyphemi* except that tyloids extend about 7 segments, the tyloids are linear with the median tyloids usually a little widened and rounded above, ovipositor sheath about 0.40 as long as front wing, ovipositor a little more compressed, and ovipositor tip about as in figure 327,n.

Male: Black. Clypeus often light brown medially; mandible white, fulvous apically; palpi white, their last segment fuscous; flagellum stramineous below, near middle whitish below, medially with a white band or dorsal white stripe that covers about 10 segments; tyloids pale brown; tegula white, its apex light brown; front and middle coxae and trochanters entirely white or the coxae brownish basally and the trochanters with a brownish stripe above; front and middle legs beyond trochanters fulvous, their tarsi brown apically; hind coxa black to brown, usually pale brown or whitish apically; hind first trochanter entirely brown or partly fulvous, sometimes whitish below; hind second trochanter and hind femur fulvous, the apical 0.15± of the femur fuscous; hind tibia fuscous, fading to pale fulvous basally; hind tarsus white, the apex of its fifth segment fuscous and rarely its first segment with a subbasal infuscation; wings hyaline; apical 0.3± of first abdominal segment often ferruginous; tergites 2 and 3 ferruginous, in dwarf specimens sometimes with an apical fuscous band; tergite 4 ferruginous, usually more or less of its apex fuscous; tergite 6 often with a small median apical white spot; tergite 7 with a median apical white spot except occasionally in dwarf specimens.

Female: Black. Center of clypeus often brown; mandible brown subapically; segments 2 and 3 of maxillary palpus white, brown below, the rest of maxillary palpus and all of labial palpus dark brown or fuscous; antenna blackish brown, with a median white band that covers about 6 segments; tegula dark brown; front coxa and first trochanter brown, the rest of front and middle legs fulvous, their fifth tarsal segments mostly brown; hind coxa, trochanters, and femur fulvous, the apical 0.15 of femur fuscous; hind tibia brownish fulvous, infuscate apically; hind tarsus pale stramineous, the apical 0.5± of its fifth segment dark brown and rarely its first segment with a weak subbasal infuscation; wings hyaline; tergites 1–3 fulvoferruginous; apical margin of tergite 5 sometimes with a white band; apical margin of tergite 6 always with a white band; tergite 7 with a very large white area that covers all of its dorsal aspect except near basal margin; tergite 8 often with a small median white mark.

Specimens (209♂,136♀): From Alabama (Pyriton in Clay Co.); Connecticut (Hartford, North Haven, North Stonington, Pomfret, South Meriden, and Storrs); District of Columbia (Washington); Illinois; Louisiana (Gibsland); Maine (Bangor); Maryland (Annapolis, Cabin John, Odenton, Patuxent Refuge near Bowie, Plummers Island, and Takoma Park); Massachusetts (Amherst, Cambridge, Dorchester, Malden, and Wollaston); Michigan (Ann Arbor, East

Lansing, Ionia Co., Midland Co., and Wayne Co.); Minnesota (Duluth and Ramsay Co.); New Hampshire (Jefferson); New Jersey (Camden Co., Moorestown, New Brunswick, and Paterson); New York (Brooklyn, Farmingdale, Ithaca, Kingston, Nyack, Six Mile Creek near Ithaca, Stony Point, Tuxedo, and West Farms in New York City); North Carolina ("Chasteen Creek" in Great Smoky Mountains National Park); Northwest Territories (Norman Wells); Ohio (Cleveland, Huron Co., and Scioto Co.); Ontario (Chatham, London, Ottawa, and Toronto); Pennsylvania (Cresheim Valley near Philadelphia, Mount Hope, Philadelphia, and Wissahickon-Fairmount Park near Philadelphia); Rhode Island (Alton); and Virginia (Arlington, Dayton, Falls Church, Great Falls, McLean, and Rosslyn).

A large portion of the specimens are known or presumed to have been reared. The collection dates of the specimens known or believed to have been collected as adults fall mostly in July and late June, but the total range is from early to late summer. Unusually early and late dates of specimens collected as adults are: May 26 at New Brunswick, N.J.; June 1 at Ithaca, N.Y.; June 10 at Falls Church, Va.; September 1 at Stony Point, N.Y.; September 7 at Takoma Park, Md.; and September 18 at Alton, R.I.

Reared specimens or reared lots are: 30 rearings from *Callosamia promethea*, 1 from *C. angulifera*, 2 from *Callosamia* sp., 1 from *Samia cynthia*, 1 from *Antheraea polyphemus*, 1 from *Acronicta*, 1 from *Battus philenor*, 1 from "silk moth," and 1 "attacking man." The normal host of the species is certainly *Callosamia* and records of other hosts need verification. Parasitized *Callosamia* cocoons are packed tight with the ichneumonid cocoons, which give rise to about eight adult parasites, usually of both sexes. Overwintering is in the host cocoon and emergence from cocoons brought indoors is from about February to mid-summer.

This species occurs in the Alleghanian and Carolinian faunas. Its normal host is *Callosamia*.

8. Gambrus extrematis (Cresson)

FIGURE 327,o

Cryptus extrematis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 304; ♀. Lectotype: ♀, Pennsylvania (Philadelphia).

Cryptus samiae Packard, 1865, Proc. Boston Soc. Nat. Hist., vol. 9, p. 345; ♂, ♀. Lectotype (hereby designated): ♀, Norway, Maine (Cambridge).

Echthrus Provancheri Provancher, 1885, Canadian Ent., vol. 17, p. 116; ♂, ♀. Lectotype: ♀, a little south of Bracebridge, Muskoka, Ont. [not Vancouver Island, B.C.] (Quebec).

Spilocryptus cecropiae Habermehl, 1919, Zeitschr. Wiss. Ins.-Biol., vol. 14, p. 239, ♀. Type: ♀, bred from "*Pl. cecropia*" (Habermehl). Type not seen.

BIOLOGY: Riley, 1872, Ann. Rep. Ins. Missouri, No. 4, pp. 110–111.—Harrington, 1891, Ann. Rep. Ent. Soc. Ontario, No. 21, p. 67.—Smith, 1908, Journ.

Econ. Ent., vol. 1, pp. 294–297.—Schaffner and Griswold, 1934, Misc. Pub., U.S. Dep. Agr., No. 188, p. 141.—Marsh, 1937, Ecology, vol. 18, pp. 107–111.—Marsh, 1937, Ann. Ent. Soc. Amer., vol. 30, pp. 40–42.—Marsh, 1938, Journ. New York Ent. Soc., vol. 46, p. 27.

Morphology: Riederer, 1890, Journ. New York Micros. Soc., vol. 6, pp. 99–101.

Front wing 4.5 to 9.8 mm. long; similar in structure to *G. polyphemi* except that the body is a little more slender, tyloids extend about 7 segments and all of them are linear and sharp, punctures on second tergite a little denser, ovipositor sheath about 0.87 as long as front wing, and ovipositor tip is less specialized (see fig. 327,o).

Male: Black. Clypeus often brown medially; mandible brown medially; palpi white, their bases brown and last segment of maxillary palpus more or less brownish; labial palpus sometimes entirely brown; flagellum pale brown below, palest near the middle, medially with a dorsal white stripe that covers about 8 segments, in dwarf specimens the stripe often reduced or rarely absent; tyloids brown; tegula fulvous, usually paler basally; front coxa pale brown to dark brown, usually stramineous apically; middle coxa entirely stramineous to largely dark brown, always with at least some stramineous or pale brown; front and middle trochanters entirely yellowish white or the first trochanters partly or entirely brown; front and middle legs beyond the trochanters fulvous, their tarsi brown apically; hind coxa brown to black, usually paler apically; hind trochanters and femur fulvous, the apical 0.18± of femur fuscous; hind tibia fuscous, brownish fulvous toward base; segment 1 of hind tarsus fuscous, its base and apex usually whitish; segment 2 of hind tarsus white, sometimes subbasally brown; segments 3–4 of hind tarsus white, the apex of segment 4 sometimes fuscous; segment 5 of hind tarsus brown, its base usually white; wings hyaline; apical 0.2± of segment 1 of abdomen and all of tergites 2–4 fulvoferruginous.

Female: Colored like the female of *G. polyphemi* except that hind basitarsus tends to be more completely and strongly fuscous and that tergite 4 is entirely black.

Specimens (430♂, 291♀): From British Columbia (Cranbrook); California (Santa Cruz Mts. in Santa Clara Co.); District of Columbia (Washington); Florida; Illinois (Fairbury, Chicago, and Urbana); Kansas (Onaga and Riley Co.); Maine (Enfield and Orono); Massachusetts (Boston); Michigan (East Lansing and Menominee Co.); Minnesota; Missouri (Columbia); New Jersey (Newark, New Brunswick, and Paterson); New York (Big Indian Valley in Catskill Mts., Elmhurst, Flatbush, Forest Park on Long Island, Jamaica, Ithaca, Maspeth, New York, and Rockaway); North Dakota (Dickinson); Nova Scotia (Annapolis); Ontario (Ottawa and Uplands Airport in Ottawa); Pennsylvania (Ohiopyle, Philadelphia, "Philadelphia

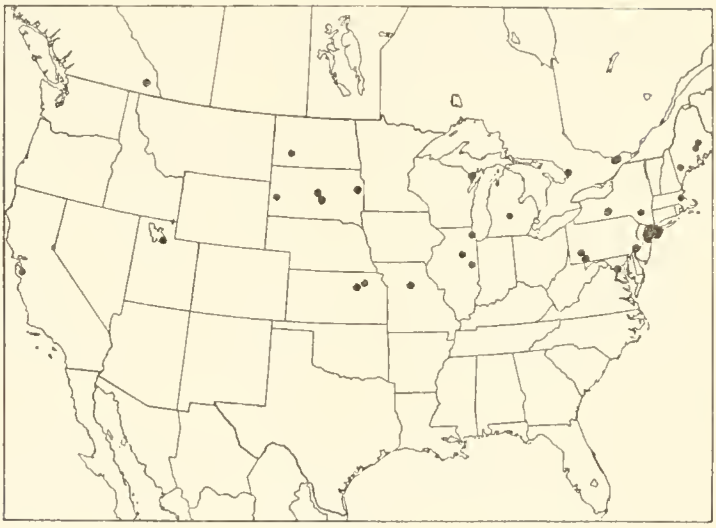


FIGURE 33.—Localities for *Gambrus extrematis.*

Neck," and Pittsburgh); South Dakota (Black Hills, Brookings, Chamberlain, and Highmore); Utah (Salt Lake City); and Wisconsin.

The great majority of the specimens are known or suspected to have been reared indoors. The species is presumed to be adult throughout the summer. As an illustration of the scarcity in the field, we ourselves have never collected it. Specimens with host records include 29 lots reared from *Hyalophora cecropia*, 2 from *H. columbia*, and 1 from *H. euryalus kasloensis*.

There have been several publications on the biology of this species, as noted under the synonymy. The papers by Marsh are particularly interesting. In the account given in "Ecology," he relates:

> As soon as cocoon spinning [of the *cecropia*] has progressed to a thin-shell stage, females of the ichneumonid have been observed coming up the wind to it as Canthon beetles follow up wind to fresh horse droppings. The ovipositor is thrust through the cocoon, and eggs are deposited on the inside of the cocoon or on the surface of the larva. Over one thousand eggs have been counted in one early-spun cocoon resulting from the oviposition of several females, while the greatest number of cocoons of [*G.*] *extrematis* in a single Cecropian cocoon was 172. As no starved larvae have been found, cannibalism is indicated. The average infestation of Cecropian cocoons with [*G.*] *extrematis* was found to be thirty-three. During oviposition, the host larva is thrust with the ovipositor and invariably dies within a few hours. The larvae of [*G.*] *extrematis* move about freely over the dead host larva at first feeding on cuticle, later burrowing down and drinking body fluids. In cases of heavy parasitism all the host body is eaten except the few chitinized parts. In the Chicago area [*G.*] *extrematis* is double brooded, completing a cycle in about eighteen days.

Overwintering is in the host cocoon. In spring or early summer parasitized cocoons brought indoors begin to yield their parasites, which emerge from a single cocoon over a period of about a week, through several holes cut to the outside. A single cocoon may yield all parasites of one sex, or some of both sexes. Parasitized host cocoons are filled solid with a mass of cocoons of the parasites.

This species is transcontinental in the Transition zone. It parasitizes *Hyalophora* spp. and is a well-known enemy of *H. cecropia.*

9. Gambrus polyphemi Townes

FIGURE 328,a

Cryptus sordidus Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 67; ♀. Name preoccupied by Tschek, 1870. Type: ♀, Ottawa, Ont. (Quebec).

Gambrus polyphemi Townes, 1945, Mem. Amer. Ent. Soc., vol. 11, p. 809. New name.

Front wing 5.2 to 9.8 mm. long; clypeus short, rather strongly convex, its apex impressed but medially less strongly and less broadly impressed than it is laterally so that the clypeus appears to have a very weak, broad, median projection; temples rather wide and full; tyloids extending about 10 segments, the basal 5± tyloids linear, sharp, and very narrow, the apical 5± tyloids elongate elliptic, flat or weakly convex on top, the median of these 5± the widest and about 0.28 as wide as the flagellar segment bearing it; mesoscutum mat, or the central part of its lateral lobes subpolished, its punctures of moderate size, rather shallow, separated by about their diameter; mesopleurum polished with moderately strong coarse punctures in some restricted areas, mostly with reticulate wrinkling that obscures or replaces the punctures; second tergite weakly mat, its punctures of moderate size, in male rather shallow and separated by about 1.0 their diameter, in female moderately deep and separated by about 1.5 their diameter, in both sexes smaller and sparser on basal and apical parts of the tergite than elsewhere; ovipositor sheath about 0.47 as long as front wing; ovipositor moderately compressed, its tip as in figure 328,a.

Male: Black. Clypeus often light brown medially; mandible often white or partly white; palpi white, their last segments infuscate; flagellum light brown beneath, palest medially, medially with a dorsal

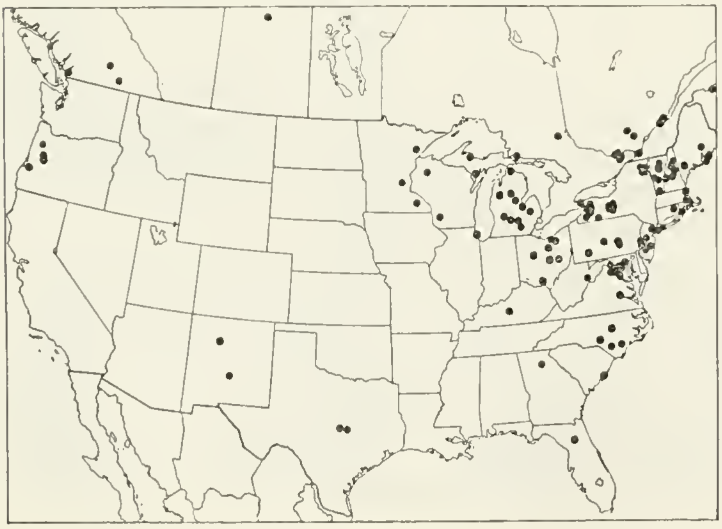


FIGURE 34.—Localities for *Gambrus polyphemi.*

white stripe that covers about 8 segments; tyloids light brown; tegula white, its apex usually light brown; front and middle coxae and trochanters whitish, the coxae more or less brown basally and mesally, and sometimes with an external brownish area; front and middle legs beyond coxae pale fulvous, their tarsi even paler but brownish at the tips; hind coxa blackish, with a whitish or pale fulvous area on apex below, sometimes the apex more extensively pale; hind first trochanter whitish to black, usually stramineous with its hind side brown; hind second trochanter and femur fulvoferruginous, the apical 0.18± of the femur fuscous; hind tibia brown, blackish brown apically; segment 1 of hind tarsus fuscous, its basal 0.12 and usually its apical 0.2 to 0.6 white, rarely the entire segment white; segments 2–5 of hind tarsus white, the fifth segment brown apically; wings hyaline; tergites 2–4 and usually the apical 0.15± of tergite 1, ferruginous, usually more or less of apex of tergite 4 black.

Female: Black. Mandible dark ferruginous apically; palpi fuscous but the apex of segments 2 and 3 of maxillary palpus usually white; flagellum blackish brown, with a median white band that covers about 6 segments; front coxa, first trochanter, and front side of second trochanter brown or fuscous; front femur often with some infuscation basally; rest of front and middle legs fulvoferruginous, their fifth tarsal segments with a brownish tinge; hind coxa, trochanters, and femur ferruginous, the apical 0.15± of femur fuscous; segment 1 of hind tarsus brownish, its base narrowly and its apex more broadly whitish or pale brown; segments 2–5 of hind tarsus whitish, the apical part of fifth segment brown; wings hyaline; segments 1–3 of abdomen ferruginous, the first segment a little infuscate basally; segment 4 of abdomen more or less ferruginous, its apex always fuscous; tergite 7 with a very large median white spot.

Specimens (132♂, 235♀): From British Columbia (Robson, Salmon Arm, and Vancouver); Connecticut (Ledyard); District of Columbia (Washington); Florida (Alachua Co.); Georgia (White Sulphur Springs in Hall Co.); Illinois (Chicago); Kentucky (Mammoth Cave National Park); Maine (Bar Harbor, Mount Desert, Norway, and Orono); Maryland (Cabin John, Club Hill, Plummers Island, and Takoma Park); Massachusetts (Middlesex Fells, Sharon, and Taunton); Michigan (Ann Arbor, Clare Co., Douglas Lake, East Lansing, Huron Mts., Ionia Co., Loon Lake in Lake Co., Menominee Co., Midland Co., Pinckney, Rudd's Mills in Oakland Co., and Saginaw Co.); Minnesota (Hennepin Co., Olmsted Co., and St. Louis Co.); New Brunswick (Campbellton); New Hampshire (Conway, Franconia, Hanover, Holderness, and Mount Washington); New Jersey (Browns Mills, Moorestown, Paterson, and Ringoes); New Mexico ("Hells Canyon," Jemez Springs, "Monzano National Forest," and Rio

Ruidoso in the White Mts. at 6,500 ft.); New York (Beaver Brook on McLean Reserve, Bemus Point, Boston, Buffalo, Chafee, Dix Hills on Long Island, East Aurora, Farmingdale, Grass Bog 2 in McLean Reserve, Ithaca, Keene Valley in Adirondacks, Ludlowville, top of Mount Marcy, top of Mount McIntyre, New Russia, Six Mile Creek near Ithaca, and Whitesville); North Carolina (Elizabethtown, Raleigh, Southern Pines, and Wallace); Nova Scotia (Smith's Cove); Ohio (Adams Mills, Bedford, Hopewell Township in Licking Co., Jefferson, Puritas Springs in Cuyahoga Co., Ridgeway, and Scioto Co.); Ontario (Dow's Swamp near Ottawa, 10 miles east of Echo Bay, Ottawa, Temagami, and Vineland Station); Oregon (Corvallis, Cottage Grove, Eugene, and Smith River in Douglas Co.); Pennsylvania (Charter Oak, Doylestown, Germantown, Harrisburg, Inglenook, and Westmoreland Co.); Quebec (Aylmer, Duchesnay, Lac Mercier, Montreal Island, Queen's Park near Aylmer, Sainte-Agathe-des-Monts, and Sainte-Foy); Rhode Island (Westerly); Saskatchewan (Prince Albert National Park); South Carolina (McClellanville); Texas (Cypress Mill and Gillespie Co.); Vermont (Laurel Lake near Jacksonville, Plainfield, Rutland, Willoughby, and Woodstock); Virginia (Falls Church, Glencarlyn, Great Falls, Mount Vernon, and Richmond); Washington ("Lucia Falls"); West Virginia (Bolivar and Cheat Mt. at 2,000 ft.); and Wisconsin (Gays Mills and Sawyer Co.).

Most dates of collection are from June 1 to September 15. Those outside of this range are: May 9 at Glencarlyn, Va.; May 11 at Raleigh, N.C.; May 19 at McClellanville, S.C.; May 25 at Pinckney, Mich.; May 30 at Elizabethtown, N.C.; September 16 at Ithaca, N.Y.; September 17 at Aylmer, Que.; September 19 at Ann Arbor, Mich.; September 22 and 23 at Bolivar, W. Va.; "October" at Jefferson, Ohio; October 1 at Middlesex Fells, Mass.; October 7 at Puritas Springs, Cuyahoga Co., Ohio; October 28 and 29 and November 8 at Southern Pines, N.C.; and November 7 at Takoma Park, Md.

Rearing records are as follows: 22 lots reared from *Antheraea polyphemus*, 3 from *Hyalophora cecropia*, and 1 from "cocoon." The normal host is certainly *Antheraea polyphemus* and records from *Hyalophora cecropia* need verification. None of the specimens labeled as parasitic on *H. cecropia* are accompanied by the host cocoon. They may have emerged from a mixed lot of cocoons containing both *polyphemus* and *cecropia*, and have been wrongly assumed to be parasites of *cecropia*.

A parasitized *Antheraea* cocoon is packed full of the cocoons of the parasite. About 15 specimens, usually of both sexes, emerge from each host. Overwintering is in the host cocoon.

In our collecting we have found the species moderately common in or along the edges of deciduous woods.

This species is transcontinental in the United States and southern Canada. It is much more common in the East than in the West. *Antheraea polyphemus* is the normal host.

4. Genus Mallochia

FIGURE 310,a

Mallochia Viereck, 1912, Proc. U.S. Nat. Mus., vol. 43, p. 591. Type: *Mallochia agenioides* Viereck; original designation.

Front wing 3.5 to 7.3 mm. long; body rather elongate, subcylindric; frons unarmed; clypeus of moderate size, rather strongly convex, its apex broadly truncate and with a small median tooth; epomia absent or very short and weak; mesoscutum moderately long, strongly convex, polished, subpolished, or more or less mat, with moderate-sized punctures; notaulus moderately sharp, extending about to center of mesoscutum; prepectal carina ending at or above middle of hind margin of pronotum; propodeum elongate, in profile evenly convex, its basal carina complete and apical carina absent; propodeal spiracle circular; areolet small, pentagonal in general shape but open on the outer side; ramellus absent; second discoidal cell strongly narrowed basally; nervulus a little basad of basal vein; mediella strongly arched; nervellus broken near its lower 0.3; axillus close to anal margin; first abdominal segment short, stout, gradually widened to apex, its spiracle only a little beyond the middle, without a subbasal lateral tooth and without median dorsal carina, its dorsolateral carina absent or obsolescent, its ventrolateral carina present and complete; second tergite subpolished or mat, with dense, moderate-sized punctures; tergite 7 sometimes with a white spot; ovipositor sheath 0.37 to 0.50 as long as front wing; ovipositor compressed.

Mallochia contains four species in southern United States, one of them ranging northward to the southern edge of Ontario. The rest of the genus is Neotropic. The species are found in low grassy or weedy vegetation, more or less in sunlight. They are seldom collected, but are probably common. None have been reared.

Keys to the Nearctic species of Mallochia

MALES

1. Thorax largely black 2
   Thorax entirely fulvous 3
2. Lateral lobe of mesoscutum closely punctate all over; upper margin of pronotum yellow; second and third tergites entirely fulvous . **1. agenioides** Viereck
   Lateral lobe of mesoscutum closely punctate on its front half, its hind half almost impunctate; upper margin of pronotum black; second and third tergites fuscous with their apical parts fulvous or yellowish
   3. frontalis, new species

3. Punctures on lateral lobe of mesoscutum moderately coarse.
2. strigosa (Cresson)
Punctures on lateral lobe of mesoscutum very fine and weak.
4. laevis, new species

FEMALES

1. Punctures of mesoscutum and mesopleurum very fine and rather sparse, separated by several times their diameter; upper edge of lower valve of ovipositor enclosing the lower part of upper valve (fig. 328,e)
4. laevis, new species
Punctures of mesoscutum and mesopleurum moderately coarse and close, separated by less than their diameter; upper edge of lower valve of ovipositor not enclosing the upper valve (figs. 328, b, c, and d) 2
2. Frons and vertex fuscous medially, white laterally; hind half of lateral lobe of mesoscutum sparsely punctate; scutellum and lower margin of pronotum white; front wing without a median brown area . . **3. frontalis,** new species
Frons and vertex fulvous; hind half of lateral lobe of mesoscutum rather densely punctate; scutellum and lower margin of pronotum fulvous; front wing usually with a median brown area 3
3. Ovipositor moderately compressed, about 3.7 as long from nodus to tip as it is deep at nodus (fig. 328,b); edges of median brown spot on front wing indistinct, the spot sometimes lacking . . . . . . **1. agenioides** Viereck
Ovipositor strongly compressed, about 2.6 as long from nodus to tip as it is deep at nodus (fig. 328,c); edges of median brown spot on front wing sharply defined . . . . **2. strigosa** (Cresson)

1. Mallochia agenioides Viereck

Figures 328,b; 331,a

Mallochia agenioides Viereck, 1912, Proc. U.S. Nat. Mus., vol. 43, p. 591; ♀. Type: ♀, Glencarlyn, Va. (Washington).

Front wing 3.8 to 5.3 mm. long; punctures on mesoscutum rather coarse, separated by about 0.4 their diameter, posteriorly perceptibly sparser but still rather close; punctures on mesopleurum coarse, separated by about 0.7 their diameter in male, by about 0.4 their diameter in female; ovipositor tip as in figure 328,b.

Male: Head and body marked with black, pale yellow, and fulvous about as in figure 331,a; palpi pale yellow, darkened apically; scape and pedicel pale brown, fuscous above; flagellum black; front and middle legs fulvous, the front coxa and trochanters and front side of middle coxa yellow, their tarsi fuscous apically; hind coxa, trochanters, femur, and tibia fulvous, the apex of tibia a little darkened; hind tarsus fuscous, usually all of the third segment, usually part or all of the second segment, and sometimes apex of first segment and base of fourth segment, white; wings subhyaline, the apical part of front wing faintly brownish.

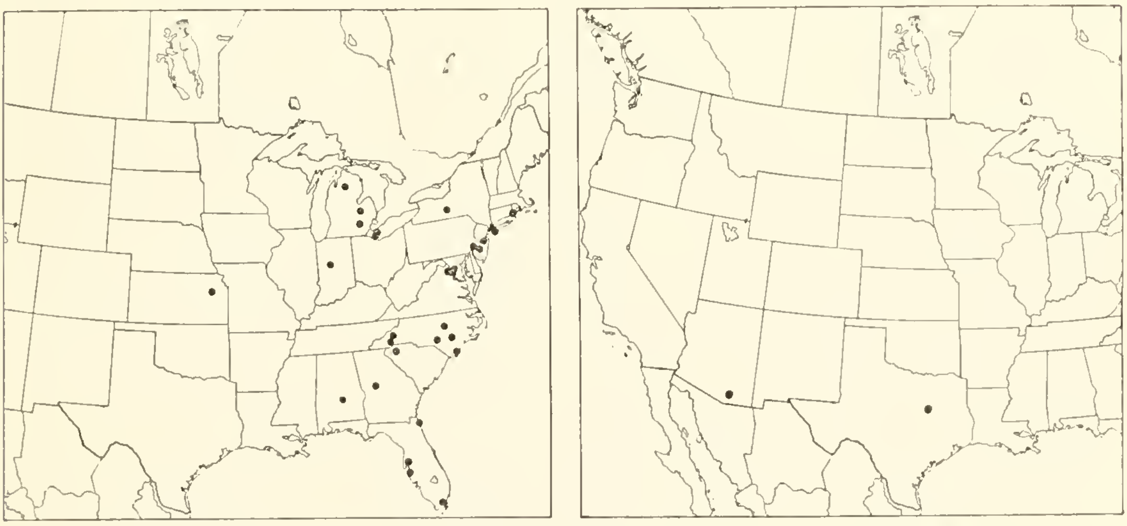
Female: Fulvous. Flagellum fuscous, fulvous basally, with an incomplete white band that covers about four segments; wings faintly tinged with yellowish brown, the front wing with median and subapical brownish areas, the median brown area sometimes lacking.

Specimens (34♂, 27♀): From Alabama (Prattville); District of Columbia (Anacostia); Florida (Fort George, Lutz, Oneco, and Paradise Key); Georgia (Griffin); southern Illinois; Indiana (Lafayette); Kansas (Lawrence); Michigan (Ann Arbor, Genesee Co., and Otsego Co.); New Jersey (Jamesburg and Moorestown); New York (Babylon, Farmingdale, and Ithaca); North Carolina (Clinton, Crabtree Meadows in Yancey Co. at 3,600 ft., Lake Toxaway, Raleigh, Southern Pines, and Southport); Ohio (Put-in-Bay); Ontario (Pelee Island); Pennsylvania (Philadelphia); Rhode Island (Westerly); South Carolina (Greenville); and Virginia (Falls Church and Glencarlyn).

Collection dates are from mid-spring to mid-summer, plus a few records in August. Unusually early and late seasonal records are: February at Paradise Key, Fla.; March 2 at Lutz, Fla.; May 3 at Falls Church, Va.; May 20 at Ann Arbor, Mich.; August 5 at Crabtree Meadows, 3,600 ft., Yancey Co., N.C.; August 12 at Griffin Ga.; and August 21 at Prattville, Ala.

We find the species in grassy overgrown meadows, mostly in June and early July.

This species occurs in the Carolinian, Austroriparian, and Tropical faunas.



FIGURES 35, 36.—Localities: 35 (left), *Mallochia agenioides;* 36 (right), *M. strigosa.*

2. Mallochia strigosa (Cresson)

FIGURE 328,c

Mesoleptus? strigosus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 167; ♂. Type: ♂, Bosque Co., Tex. (Washington).

Male: Front wing 4.5 mm. long; mesoscutum weakly **mat,** with rather coarse punctures that are separated by about 1.4 their diameter.

Fulvous. Temple and orbit in front yellowish; tarsi brownish apically; wings hyaline.

Female: Front wing 6.0 mm. long; mesoscutum weakly mat all over, with moderately strong, medium-sized punctures that are separated by about 0.6 their diameter; mesopleurum with moderately coarse, sharp punctures all over except on speculum, the punctures separated by about 0.4 their diameter; ovipositor tip as in figure 328,c.

Fulvous. Orbit tinged with yellow; flagellum blackish, with an incomplete white band that covers about 5 segments.

It is not certain that the male and female described above belong to the same species.

Specimens: ♀, Santa Rita Mts., Ariz., July 17, 1932, R. H. Beamer (Lawrence). ♂ (type), Bosque Co., Tex. (Washington).

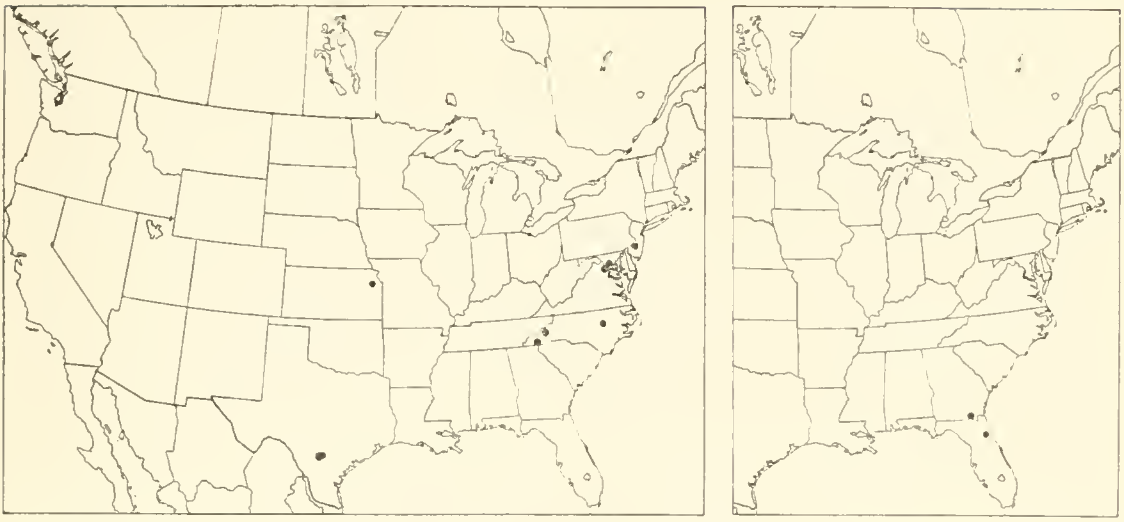
3. Mallochia frontalis, new species

Figures 328,d; 331,b

Front wing 3.8 to 5.5 mm. long; punctures on mesoscutum rather coarse, on front half separated by about 0.5 their diameter, behind the middle much sparser, separated by several times their diameter; punctures on mesopleurum rather small but sharp, lacking from the posterodorsal 40% of mesopleurum, elsewhere separated by about 0.4 their diameter; ovipositor tip as in figure 328,d.

Male: Head and body marked with black, white, and fulvous about as in figure 331,b; palpi pale yellow, darkened apically; scape and pedicel brown; flagellum fuscous; front and middle legs fulvous, the front coxa and trochanters and usually the front side of middle coxa pale yellow, their tarsi brownish, darker apically; hind coxa, trochanters, and femur fulvous, the first trochanter brownish; hind tibia light brown, darker at base and apically; hind tarsus fuscous, the third segment, usually all or most of second segment, and often more or less of basal part of fourth segment, white.

Female: Fulvous. Broad orbital ring (narrowed on upper part of temple and broadened on middle and lower part of temple), usually the clypeus medially, collar and anterior part of lower margin of pronotum, hind corner of pronotum, tegula, subtegular ridge, a pair of dashes near middle of mesoscutum, scutellum, postscutellum, upper division of metapleurum, and a broadly oval subapicolateral spot on propodeum, ivory white; frons fuscous, fulvous ventrally and white laterally; vertex and occiput fuscous, the vertex white near eyes; pedicel brown; flagellum fuscous, with an incomplete white band that covers about 4 segments; tarsi a little darkened apically; wings subhyaline, the front wing with a pale subapical brown band; extreme apex of first tergite sometimes whitish.



Figures 37, 38.—Localities: 37 (left), *Mallochia frontalis;* 38 (right), *M. laevis.*

Type: ♀, Moorestown, N.J., June 23, 1939, H. and M. Townes (Washington, USNM 63754).

Paratypes: ♂, Lawrence, Kans., Apr. 29, 1895, Hugo Kahl (Washington). ♂, ♀, Patuxent Refuge near Bowie, Md., May 20, 1947, and June 6, 1948, R. M. Mitchell (Mitchell). 3♂, 1♀, Takoma Park, Md., June 3, 1945, June 21, 1942, and July 5, 1942, H. and M. Townes (Townes). 6♂, 1♀, Moorestown, N.J., June 15, 23, and 25, 1939, and July 8, 19, and 21, 1939, H. and M. Townes (Townes). ♀, Crabtree Meadows, 3,600 ft., Yancy Co., N.C., Aug. 5, 1951, H., M., and D. Townes (Townes). ♀, Franklin, 2,000 ft., N.C., May 24, 1957, W. R. M. Mason (Ottawa). ♂, Raleigh, N.C., July 3, 1935, C. S. Brimley (Raleigh). ♂, in pitcher of *Sarracenia flava*, Raleigh, N.C., May 18, 1940, D. L. Wray (Townes). ♂, on grass and low herbage, Salado Creek, Bexar Co., Tex., Mar. 13, 1952, M. Wasbauer (Berkeley). ♂, San Antonio, Tex., Apr. 3, 1947, H. and M. Townes (Townes). ♀, Vienna, Va., June 4, 1913, R. A. Cushman (Washington).

This species occurs in the Carolinian and Austroriparian faunas.

4. Mallochia laevis, new species

Figures 328,e; 331,c

Front wing 4.3 to 5.0 mm. long; mesoscutum weakly mat, its punctures very fine and weak, very sparse except at front end of median lobe, where they are moderately dense; punctures on mesopleurum fine and weak, separated by about 3 times their diameter; ovipositor tip as in figure 328,e.

Male: Head and body fulvous, the head largely yellowish as in figure 331,c. Palpi pale yellow; scape and pedicel fulvous; flagellum dark brown; legs fulvous, the front and middle tarsi brown apically, the hind tibia a little darkened apically, and the hind tarsus brown, darker apically; wings with a faint yellowish brown tinge.

Female: Fulvous. Frons with an ivory mark on each side, next to eye; temple largely yellowish; pedicel brown; flagellum fuscous, with an incomplete white band that covers almost four segments; tarsi brownish apically; wings with a weak yellowish-brown tinge, the apical part of front wing a little darker.

Type: ♀, Juniper Springs, Ocala National Forest, Fla., Apr. 5, 1953, W. R. Mason (Ottawa).

Paratype: ♂, Okefenokee Swamp, Ga., July 27, 1929, J. D. Beamer (Lawrence).

5. Genus Aritranis

Figure 310,b

Aritranis Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 187. Type: *Cryptus explorator* Tschek; designated by Viereck, 1914.

Hoplocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 508. Type: (*Hoplocryptus binotatulus* Thomson) =*fugitiva* (Gravenhorst); designated by Viereck, 1914.

Front wing 3.2 to 10.0 mm. long; body rather elongate, but the thorax sometimes rather short; frons unarmed; clypeus moderately large, weakly to strongly convex, its apex more or less truncate, almost always with a median apical point; mesoscutum rather long and strongly convex to moderately short and less strongly convex, usually polished or subpolished and with strong punctures but sometimes more or less mat and sometimes the punctures weak; notaulus sharp, extending beyond middle of mesoscutum; epomia rather long and strong; prepectal carina reaching center of hind margin of pronotum, or farther dorsad to near subtegular ridge; propodeum moderately long to quite long, its basal and apical carinae both complete or almost so, its apical carina often forming indistinct sublateral crests; propodeal spiracle circular to elliptic; areolet of moderate size, usually a rather regular pentagon but sometimes irregular with the intercubiti only weakly convergent; ramellus absent; nervulus a little basad of basal vein; mediella moderately to rather strongly arched; nervellus broken at or a little below the middle; axillus parallel to or weakly divergent from anal margin; first abdominal segment rather short to rather long, rather gradually widened to its apex, its spiracle not very far behind the middle, usually without a subbasal lateral tooth, its median dorsal carinae usually distinct to a little distad of spiracle, its dorsolateral carina complete or incomplete, its ventrolateral carina complete; second tergite mat, with moderate-sized punctures that vary in density from close to rather sparse; tergite 7 usually marked with white; ovipositor sheath 0.35 to

0.83 as long as front wing; ovipositor compressed, the teeth on its lower valve as subvertical ridges, rather widely spaced.

Aritranis is close to *Gambrus, Caenocryptus, Idiostoma* Cameron, and *Caenocryptoides*. In *Caenocryptoides* the clypeus has a rather strong preapical convexity (the convexity a little impressed medially), the basal ridges of the ovipositor tip slant forward and upward, the apical carina of the propodeum is obsolescent, and the petiole has a blunt basolateral tooth. Otherwise it is rather like *Aritranis*. The species of *Caenocryptoides* are eastern Palearctic. In *Caenocryptus* the areolet is more or less pentagonal and always rather small, the second recurrent vein arched outward from its attachment to the areola, and the body punctures average weaker than in *Aritranis*. It appears to be no more than a weakly differentiated offshoot of *Aritranis*. The species of *Caenocryptus* are Palearctic. The distinction between *Aritranis* and *Gambrus* is more difficult. Both genera may be polyphyletic, and though it seems unwise either to synonymize them, or to subdivide on the obscure phyletic lines, no really natural and satisfactory division between the two seems possible. See the key to genera for the most useful differences. Among the Nearctic species, *A. affabilis* is of doubtful affinities. In most structural characters it is like *Aritranis*, but it has a definite basolateral tooth on the petiole and the mesoscutum is mat as in *Gambrus*. *Idiostoma* is an Ethiopian genus, known only from the genotype, and not available now for comparison.

The synonymy of *Hoplocryptus binotatulus* Thomson, 1873, with *Cryptus fugitivus* Gravenhorst, 1829, noted above in the generic synonymy, is based on a comparison of Thomson's types with specimens of *fugitivus* from central Europe; but we have not studied Gravenhorst's type. The type of *Cryptus explorator* Tschek, the genotype of *Aritranis*, is in Vienna. It represents a species close to the Nearctic *A. imitator*.

This genus is of Holarctic distribution, with nine species in the Nearctic region and a larger number in Eurasia. Hosts are borers in stems, twigs, or grass culms, or the nests of Aculeata in twigs, or sawfly pupae in weed stems. Adults are usually collected among low vegetation of all kinds, often in overgrown fields or along the edges of woods.

Key to the Nearctic species of Aritranis

1. Hind coxa and trochanters black; apical transverse carina of propodeum evenly arched or weakly sinuate; thorax short and stout; first tergite long.
9. imitator (Provancher)
Hind coxa and trochanters ferruginous (rarely black in males of *A. notata*); apical transverse carina of propodeum bowed forward in the middle, sinuate; first tergite shorter 2

2. First tergite with a basolateral tooth; head of both sexes entirely black; mesoscutum of female mat and with fine weak punctures.
   1. **affabilis** (Provancher)

   First tergite without a basolateral tooth; head usually marked with white, at least on the clypeus, cheek, or frontal orbit, or if entirely black then the mesoscutum polished and with moderately large, strong punctures . . . 3
3. Metapleurum and propodeum entirely black; face of male with white markings, or sometimes entirely white . . . . 8. **notata** (Provancher)

   Metapleurum and propodeum partly or entirely ferruginous, or in some males of *A. albicollaris clypeata* these are entirely black, but in this subspecies the face is entirely black, which differentiates it from male of *A. notata* . . 4
4. Punctures on mesoscutum fine and weak; mesoscutum strongly mat.
   2. **byrsina,** new species

   Punctures on mesoscutum coarse and strong; mesoscutum polished or mat . 5
5. Mesoscutum with a central white spot; clypeus in profile very strongly convex, its apical margin without a trace of a tooth; hind basitarsus entirely white. Female unknown . . . . 6. **barberi,** new species

   Mesoscutum without a central white spot; clypeus in profile weakly or moderately convex, its apical margin with a weak or very weak median tooth; hind basitarsus usually not entirely white 6
6. Mesoscutum somewhat mat and strongly punctate; male with temple mostly white and the seventh tergite without a white spot; front wing of female with a postmedian cloud and the wing apex infuscate.
   5. **nubecula,** new species

   Mesoscutum polished and strongly punctate; male with temple mostly white, ferruginous, or black, if white then the seventh tergite with a white spot; front wing of female uniformly subhyaline 7
7. Dorsolateral carina of first tergite strong and sharp between its spiracle and base; temple entirely black . . . . 7. **albicollaris** (Cresson)

   Dorsolateral carina of first tergite indistinct or obsolescent between its spiracle and base; temple partly or entirely white or ferruginous on its lower half . 8
8. Apical transverse carina of propodeum rather evenly curved or only weakly bowed forward at the middle (so that median forward extension of apical area of propodeum is not more than about 0.25 as long as wide); hind basitarsus of male brown with not more than its apical 0.15 white.
   3. **linnae,** new species

   Apical transverse carina of propodeum strongly bowed forward at the middle (so that median forward extension of apical area of propodeum is about 0.4 as long as wide); hind basitarsus of male fuscous with its apical 0.4 to 0.7 white . . . . 4. **gracilis** (Provancher)

1. Aritranis affabilis (Provancher), new combination

Cryptus affabilis Provancher, 1877, Naturaliste Canadien, vol. 9. p. 13; ♀. Type: ♀, Que. (Quebec).

Front wing 3.2 to 5.4 mm. long; clypeus weakly convex, its apex weakly reflexed, with a moderately strong, blunt, median tooth; thorax moderately elongate; mesoscutum mat, its lateral lobes mostly subpolished, in the male its punctures of moderate size and very weak, in the female its punctures small and rather weak; apical carina of propodeum strong throughout, in female weakly produced sublaterally, strongly sinuate, its median part bowed forward; areolet of moderate size, pentagonal; second recurrent making a 120° angle with basal abscissa of subdiscoideus; first tergite of moderate length, with a small, triangular, basolateral tooth; median dorsal carinae of first tergite rather strong and sharp from its base to center of postpetiole; dorsolateral carina of first tergite strong and sharp throughout; postpetiole mat, with a few small, weak punctures; second tergite mat, with medium sized, shallow punctures that are separated by about 0.5 their diameter in male, by about 0.7 their diameter in female; ovipositor sheath about 0.42 as long as front wing.

Male: Black. Mandible yellow or fulvous; palpi yellow or white, their apices brownish; antenna blackish brown, the scape often brown in front; thorax black, the collar and hind corner of pronotum sometimes white, scutellum and postscutellum ferruginous, fuscous, or white, and metathorax and propodeum often more or less ferruginous; tegula white; front and middle legs fulvous, their trochanters largely or entirely yellow and their tarsi brownish, darker apically; hind coxa, trochanters, femur, and tibia ferruginous, the tibia a little darker and the apical 0.18 ± of femur and tibia more or less infuscate; first and last segments of hind tarsus brown, the rest white, partly white, or brown, if brown the joints paler; abdomen ferruginous, the first tergite often with a median infuscate area, and basal 0.6 ± of tergites 2 and 3 often more or less infuscate; tergite 4 varying between entirely ferruginous, fuscous with its apical half ferruginous, and entirely fuscous; fifth and following tergites black, the seventh usually with a median apical white spot, rarely the sixth with a small white spot.

Female: Head black. Clypeus often with a ferruginous stain; mandible ferruginous; palpi fuscous; antenna fulvous brown basally, blackish brown apically, with a median white stripe above that covers about 5 segments; thorax ferruginous, in a few specimens more or less infuscate anteriorly; tegula ferruginous; legs ferruginous, the fifth tarsal segments brownish, apical 0.2 ± of hind femur infuscate, and apical 0.2 ± of hind tibia weakly infuscate; hind tibia and tarsus light ferruginous brown; abdomen ferruginous, the apex of the fourth tergite and all of the following black, the seventh and eighth tergites each with a large white dorsal spot.

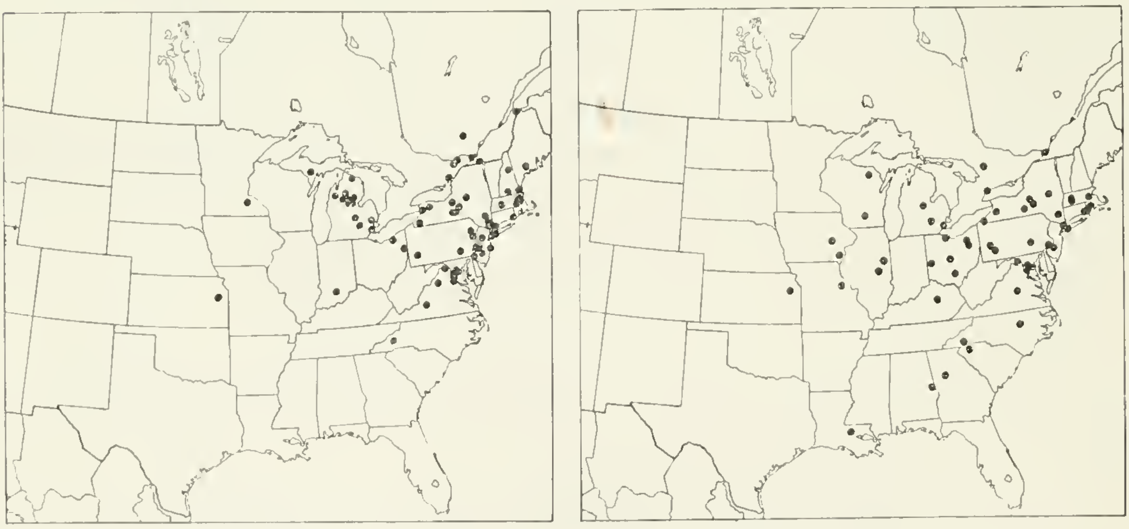
Specimens (86♂, 46♀): From Connecticut (Stonington and Winnipauk); Delaware (New Castle); Indiana (Pinhook); Kansas (Lawrence); Maine (Pittston); Maryland (College Park, Glen Echo, and Takoma Park); Massachusetts (Amherst, Arnold Arboretum in Boston, Holliston, Lexington, and Medford); Michigan (Ann Arbor, Bath, Cheboygan Co., Clare Co., Dickinson Co., Gladwin Co., Grosse Ile in Wayne Co., Isabella Co., Macomb Co., Manistee Co., Midland Co., Osceola Co., and Roscommon Co.,); Minnesota (Cannon River); New Hampshire (Hampton, Jaffrey, and Randolph); New Jersey

(Moorestown, Seaside Park, and Somerville); New York (Chautauqua Co., Farmingdale, Gasport, Ithaca, Lake Sebago in Bear Mountain Park, Long Beach, McLean Reservation in Tompkins Co., Poughkeepsie, Ringwood in Tompkins Co., Salisbury Center, Shokan, Syracuse, Tonawanda Indian Reservation in Erie Co., and lower Westchester Co.); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft.); Ohio (Cleveland and Ellsworth); Ontario (Bells Corners, Gananoque, and Ottawa); Pennsylvania (Bartonsville, Germantown, Gladwyne, Philadelphia, Pittsburgh, Progress, Roxborough, and Spring Brook); Quebec (Hemmingford, Nominingue, Parke Reserve in Kamouraska Co., and Rigaud); Virginia (Falls Church, Hardscrabble Knob in Augusta Co., Mount Vernon, and Skyline Drive); and West Virginia (Bolivar).

Dates of collection are mostly in the summer but range from mid-spring to mid-fall. The earliest and latest records are: April 28 in Gladwin Co., Mich.; May 7 at Bath, Mich.; May 9 at Takoma Park, Md.; September 22 at Bolivar, W. Va.; and September 28 and October 2 and 22 at Ann Arbor, Mich.

Reared specimens include 4 lots reared from *Cephus pygmaeus*, 2 from *C. tabidus*, 2 from *Phlyctaenia tertialis*, 1 from *Oberea tripunctata*, 1 from *Oberea* sp. in raspberry, and 1 from *Ulmus*.

This species occurs in the Alleghanian and Carolinian faunas.



FIGURES 39, 40.—Localities: 39 (left), *Aritranis affabilis;* 40 (right), *A. byrsina.*

2. Aritranis byrsina, new species

Front wing 3.8 to 8.3 mm. long; clypeus very weakly convex, with a median apical point, the apical part of clypeus impressed on each side of the point so as to accentuate it; thorax elongate; mesoscutum strongly mat all over, with fine, rather weak punctures; apical carina of propodeum sinuate, its median part bowed forward, in female heightened sublaterally to form weak crests; areolet of moderate size, pentagonal but the intercubiti not strongly convergent; second recurrent forming a 105° angle with basal abscissa of subdiscoideus; first tergite rather short, basolaterally with a low rounded flange but not with a distinct tooth; median dorsal carinae of first tergite rather strong from its base to middle of postpetiole; dorsolateral carina of first tergite strong and sharp throughout; postpetiole mat, with a very few small, weak punctures; second tergite mat, with moderately large, moderately strong punctures that are separated by about 0.3 their diameter; ovipositor sheath about 0.50 as long as front wing.

Male: Head varying from white with its occiput and upper half, except for broad frontal orbit, black; to black with its cheek, clypeus, and small mark on frontal orbit, white; mandible and palpi white, the apex of palpi brownish; antenna black or blackish brown, the scape usually light brown in front and flagellum usually with a broad, poorly defined, postmedian whitish band; ground color of thorax fulvous, or sometimes fulvous with its front half more or less black, the mesoscutum black to fulvous, when fulvous its edges and notauli black; upper part of propleurum fuscous, the lower part white, fulvous, or sometimes black; pronotum fulvous or more or less infuscate, its collar and lower edge white; tegula, subtegular ridge, scutellum, and postscutellum white; areas near scutellum black; sometimes the mesopleurum, mesosternum, and pronotum with rather extensive whitish areas; front and middle legs fulvous, their coxae and trochanters fulvous to white and their fifth tarsal segments fulvous brown; hind coxa, trochanters, femur, and tibia ferruginous, the apical 0.1± of the femur and apical 0.2± of the tibia infuscate; hind tarsus white, the basal 0.6± of first segment and apical 0.7± of last segment dark brown; first four segments of abdomen ferruginous, the fifth entirely black or ferruginous with its apex black, the sixth and following black; seventh tergite with a very large white median spot; sixth and fifth tergites usually with a median apical white mark.

Female: Head black, or in front with brown areas; triangular mark on upper part of frontal orbit and large mark on cheek and adjacent temple, white; facial orbit and clypeus usually whitish or fulvous; mandible white, brown apically; palpi fuscous, whitish subbasally; antenna black, the scape fulvous brown except above, the flagellum with an incomplete white band that covers about 5 segments; propleurum fuscous, usually ferruginous ventrally; pronotum ferruginous or partly fuscous or black, its collar and lower margin usually ivory, at least its upper margin narrowly fuscous; mesoscutum black or ferruginous, when ferruginous its margins and notauli infuscate; scutellum and postscutellum ivory, the surrounding areas mostly fuscous; tegula and subtegular ridge ivory; mesopleurum and mesosternum ferruginous except that much or all of prepectus, median stripe on mesosternum, sternaulus, and area just below and behind subtegular ridge are black; metapleurum and propodeum ferruginous; front and middle legs ferruginous, the front coxa and trochanters sometimes partly infuscate, the fifth tarsal segments brownish ferruginous; hind leg except tarsus ferruginous, the apical 0.1± of femur and apical 0.25± of tibia infuscate; first and last segments of hind tarsus brownish ferruginous, the apex of first segment often whitish; segments 2–4 of hind tarsus white, often with ferruginous brown tinges; first three abdominal segments ferruginous; fourth segment ferruginous, usually infuscate apically and often with a small median apical white mark; fifth and following segments black, the sixth usually and fifth sometimes with median apical white marks, the seventh with a large dorsal white mark and the eighth with a smaller one.

Type: ♀, Westerly, R. I., Aug. 25, 1946, M. Townes (Washington, USNM 63755).

Paratypes (61♂, 38♀): From Alabama (Langdale); Connecticut (Stonington); Georgia (Pomona); Illinois (Decatur and Urbana); Iowa (Iowa Co. and Mount Pleasant); Kansas (Lawrence); Kentucky (Lexington); Louisiana (Baton Rouge); Maryland (Patuxent Refuge near Bowie and Takoma Park); Massachusetts (Holliston, Mount Toby, and South Hadley); Michigan (Ann Arbor, Grosse Ile in Wayne Co., and Midland Co.); Missouri (New Hartford); New Jersey (Moorestown); New York (Canajoharie, Cortland, Farmingdale, Gowanda, Ithaca, Laborador Lake in Cortland Co., New Rochelle, and Poughkeepsie); North Carolina (Mount Pisgah at 4,600 ft. and Wake Co.); Ohio (Akron, Bedford, Columbus, Greenville Township, Hocking Co., and Oak Harbor); Ontario (Kearney and Toronto); Pennsylvania (Jeannette, North East, Philadelphia, Pittsburgh, and Progress); Quebec (Montreal); Rhode Island (Buttonwoods, Kingston, and Westerly); South Carolina (Greenville); Virginia (Charlottesville and Rosslyn); West Virginia (Bolivar); and Wisconsin (Forest Co. and Madison).

Dates of collection are mostly in the summer, but range from mid-spring to mid-fall. The earliest and latest records are: April 8 at Pomona, Ga.; May 4 at Bowie, Md.; May 9 at Takoma Park, Md.; May 10 at Mount Pleasant, Iowa and at Toronto, Ont.; September 19 at Montreal, Que.; September 29 on Grosse Ile, Mich.; October 2 at Bowie, Md.; October 26 at Charlottesville, Va.; and November 7 at Takoma Park, Md.

Specimens with host data are as follows: ♂, reared from *Oberea* in raspberry stem, Progress, Pa., June 4, H. B. Kirk. ♀, reared from *Papaipema* in *Sambucus* pith, Decatur, Ill., Apr. 4, 1911. ♀, reared from *Achatodes zeae,* Baton Rouge, La., collected May 30, 1930, emerged June 3, 1930. ♀, reared from *Achatodes zeae,* Greenville Township, Darke Co., Ohio, June 26, 1930, L. G. Jones.

This species occurs in the Alleghanian and Carolinian faunas.

3. Aritranis linnae, new species

Front wing 4.5 to 6.5 mm. long. Structurally similar to *A. gracilis* except that median portion of apical carina of propodeum is only weakly bowed forward, the resulting forward extension of apical area of propodeum being only about 0.25 as long as wide. The punctation of the frons and second tergite averages a very little finer and sparser than in *gracilis.*

The specific name is for Miss Ellen Linna, typist and clerical assistant for this and some of our other publications.

There is an eastern and a western subspecies, as keyed and described below.

1. Mesoscutum black; tergites 6 and 7 black, the seventh and sometimes also the sixth with a median white spot; range: Alleghanian and Carolinian faunas . . . . **3a. linnae linnae,** new subspecies
   Mesoscutum ferruginous; tergites 6 and 7 uniformly ferruginous; range: California . . . . **3b. linnae pacifica,** new subspecies

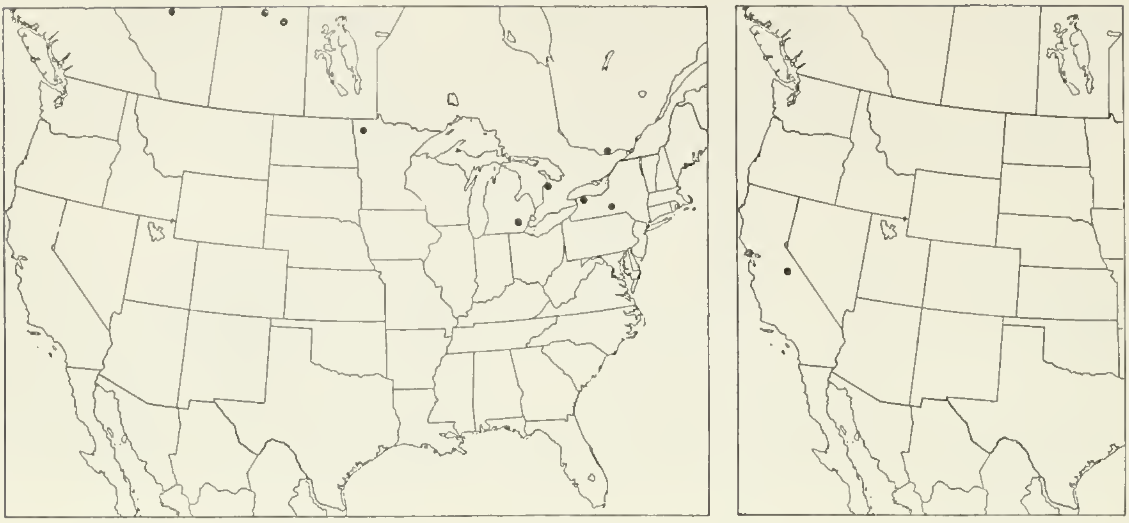
3a. Aritranis linnae linnae, new subspecies

Male: Colored like the male of *A. gracilis* except that frons has only a short, narrow white line in its lower lateral corner, white on temple covers only its lower 0.3±, hind basitarsus is dark brown with its extreme tip light brown, and tergite 5 is usually entirely black.

Female: Colored like the female of *A. gracilis* except that anterior orbits are never marked with white, white mark on cheek and temple does not extend above lower 0.25 of temple, and tergite 4 is mostly or entirely fuscous.

Type: ♀, caught in Malaise trap set in old field overgrown with *Crataegus,* Ann Arbor, Mich., June 4, 1959, H. and M. Townes (Washington, USNM 63756).

Paratypes: ♂, Edmonton, Alta., June 21, 1932, O. Peck (Townes). 17♂, 5♀, collected in same trap as the type, on scattered dates from May 26 to Aug. 13, 1959 (Townes). ♂, ♀, Ann Arbor, Mich., July 6, 1958, H. and M. Townes (Townes). ♂, Marshall Co., Minn., July 29, 1910 (St. Paul). ♂, South Hill, Ithaca, N.Y., June 13, 1956, M. A. Evans (Ithaca). ♀, West Shelby, N.Y., Sept. 2, 1950, L. L. Pechuman (Townes). ♀, Southampton, Ont., Aug. 3, 1945, G. S. Walley (Ottawa). ♀, Wakefield, Que., June 24, 1946, G. S. Walley (Ottawa). ♀, Waskesiu Lake, Sask., July 21, 1939, A. R. Brooks (Ottawa). ♀, White Fox, Sask., July 21, 1944, O. Peck (Ottawa).



Figures 41, 42.—Localities: 41 (left), *Aritranis linnae linnae;* 42 (right), *A. l. pacifica.*

This subspecies occurs in open shrubby areas from the Atlantic Ocean to the Rocky Mountains, mostly in the Transition zone. It is adult from late in May to early in September.

3b. Aritranis linnae pacifica, new subspecies

Male: Head and its appendages colored as in subspecies *linnae* except that white on frontal orbit is a little more extensive, scape is ferruginous in front, thorax ferruginous, the area around scutellum fuscous and the white markings located as in the subspecies *linnae* but these not quite so extensive, legs colored as in subspecies *linnae* except that there is no fuscous on coxae, trochanters, or hind femur, hind tibia is rather uniformly ferruginous, segment 1 of hind tarsus ferruginous brown, segment 2 of hind tarsus with its basal 0.6± often ferruginous brown, and segment 5 of hind tarsus entirely dark brown; abdomen entirely ferruginous.

Female: Ferruginous. Pedicel and flagellum blackish brown, ferruginous brown basally, the flagellum with a dorsal white stripe covering two of its median segments; areas next to scutellum infuscate; fifth segments of tarsi dark brown.

Type: ♂, Crane Flat, Yosemite Park, Calif., July 25, 1948, H., M., G., D., and J. Townes (Washington, USNM 63757).

Paratypes: 2♂, same data as type (Townes). ♀, Mill Valley, Marin Co., Calif., June 19, 1950, H. B. Leech (San Francisco).

4. Aritranis gracilis (Provancher)

Cryptus ornatus Provancher, 1886, Additions et corrections au volume ɪɪ de la faune entomologique du Canada traitant des hyménoptères, p. 63; ♀. Name preoccupied by Gravenhorst, 1829. Type: ♀, Ottawa, Ont. (Ottawa).

Cryptus scutellatus Provancher, 1886, Additions et corrections au volume ɪɪ de la faune entomologique du Canada traitant des hyménoptères, p. 69; ♀. Lapsus for *C. ornatus*; the name C. *scutellatus* is preoccupied by Smith, 1858.

Cryptus gracilis Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 74; ♂. Type: ♂, Ottawa, Ont. (Ottawa).

Cryptus zoesmairi Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 595. New name for *C. scutellatus*.

Habrocryptus graenicheri Viereck, 1904, Ent. News, vol. 15, p. 333; ♀. Type: ♀, Milwaukee, Wis. (Philadelphia).

BIOLOGY: Graenicher, 1905, Ent. News, vol. 16, pp. 43–49.

Front wing 4.2 to 7.0 mm. long; clypeus weakly convex, its apex with a blunt median tooth, impressed on each side so that tooth is accentuated; thorax elongate; mesoscutum polished, with coarse strong punctures; apical carina of propodeum strongly sinuate, its median portion strongly bowed forward so that the forward extension of apical area of propodeum on the midline is about 0.4 as long as wide; areolet rather large, subpentagonal, the intercubiti rather weakly convergent forward; second recurrent received a little basad of middle of areolet; angle between recurrent and first abscissa of subdiscoideus about 110°; first abdominal segment rather short, without a basolateral tooth, its median dorsal carinae extending most of length of the tergite but very blunt and indistinct; dorsolateral carina of first tergite weak and indistinct basad of and just beyond spiracle, more apicad becoming strong and sharp; postpetiole weakly mat, with scattered small, weak punctures; second tergite mat, with medium-sized punctures that in male are weak, indistinct, and close, in female of moderate strength, distinct, and separated by about 0.4 their diameter; ovipositor sheath about 0.42 as long as front wing; vertical ridges on ovipositor tip a little more closely spaced than in other Nearctic species of the genus.

Male: Face, clypeus, cheek, and lower 0.65± of temple white; upper half of head black except that frontal orbit is rather broadly white; mouth parts white; antenna black, the flagellum brown below and scape sometimes with a white spot in front; thorax black, the lower part of propleurum, collar, broad stripe along lower edge of pronotum, hind corner of pronotum, tegula, subtegular ridge, scutellum, postscutellum, much or most of mesosternum, and usually a spot above sternaulus, white; usually lower 0.8± of mesopleurum, usually most or all of metapleurum, and usually all of propodeum except its basal 0.1±, fulvous; front and middle coxae and trochanters white, the upper side of the first trochanters and an external apical spot on middle coxa usually brown, the rest of middle coxa sometimes partly fulvous; hind coxa and trochanters fulvous, the trochanters and apical 0.4± of the coxa usually brown above, the second trochanter whitish basally below; hind femur fulvous, its apical 0.12 weakly infuscate; hind tibia brown, ferruginous basally; first and last segments of hind tarsus light to dark brown, the apical 0.5± of first segment and basal

0.5± of last segment usually white; segments 2–4 of hind tarsus white; abdomen fulvous, tergites 5–7 infuscate, the fifth often more or less ferruginous, the seventh and sometimes also the sixth and even the fifth with a median apical white spot; occasionally the first four tergites have some infuscate areas.

Female: Head black, the frontal and facial orbit often white or partly white, face and usually clypeus blotched with brownish, and cheek and lower part of temple with a very large white mark; palpi fuscous, the maxillary palpus and sometimes also the labial palpus white subbasally; antenna black, the scape brownish and flagellum with an incomplete white band that covers about 4 segments; propleurum black, usually with a ventral ferruginous stain; pronotum black, the collar, stripe along lower margin, and hind corner white; mesoscutum black; tegula, subtegular ridge, scutellum, and postscutellum, white; areas near scutellum and postscutellum black; prepectus partly fuscous, partly ferruginous; mesopleurum, mesosternum, metapleurum, and propodeum ferruginous, the mesopleurum near subtegular ridge, usually sternaulus, and usually median stripe on mesosternum, infuscate; front coxa white and brown or white and ferruginous; middle coxa ferruginous, sometimes partly white; hind coxa ferruginous; trochanters ferruginous, usually brownish above, especially the front and middle trochanters; front and middle legs ferruginous, the fifth segments of their tarsi brown; hind femur ferruginous, its apical 0.12 weakly infuscate; hind tibia and basitarsus brownish ferruginous, the tibia paler basally; segments 2–4 of hind tarsus white, or sometimes partly brown; segment 5 of hind tarsus dark brown; abdomen ferruginous, the fourth segment rarely partly infuscate, the fifth and following segments fuscous, the seventh with a median apical white spot.

In general structure, especially in the obsolesence of the dorsolateral carina of first tergite between its spiracle and base and in the close spacing of the teeth on apex of ovipositor, this species resembles *A. linnae*, an undescribed species from China, and the European *A. signatoria.* (*Aritranis signatoria* (Fabricius) is a new combination, from *Ichneumon signatorius* Fabricius.) The species *gracilis* and *signatoria* are known to parasitize nests of aculeate Hymenoptera in twigs. *Linnae* and the Chinese species may have the same habits.

Specimens (78♂, 34♀): From Maryland (Glen Echo and Takoma Park); Michigan (Ann Arbor, George Reserve in Livingston Co., Midland Co., and Ontonagon Co.); New Jersey (Haddon Heights and Moorestown); New York (Babylon, Bemus Point, Canajoharie, Farmingdale, Ithaca, Orient, Peru, Poughkeepsie, South Hill near Ithaca, and Taughannock Falls); North Carolina (Hamrick, and

Highlands at 3,800 ft.); Ohio (Puritas Springs in Cuyahoga Co., Put-in-Bay, and Shaker Heights); Ontario (Bells Corners, Ottawa, Thunder Bay Beach, and Waubamick); Pennsylvania (Carlisle and Jeannette); Quebec (Georgeville); Vermont (Laurel Lake near Jacksonville); Virginia (Galax and Skyline Drive); and Wisconsin (Door Co. and Milwaukee).

Collection dates are mostly during June, July, and August. Those outside of this range are: May 5, 27, and 29 at Ann Arbor, Mich.; May 26 and 31 at Highlands, N.C.; May 31 at Ithaca, N.Y.; September 2, 4, 8, 12, 19, and 23 at Ann Arbor, Mich.; September 6 at Takoma Park, Md.; and September 22 at Bolivar, W. Va.

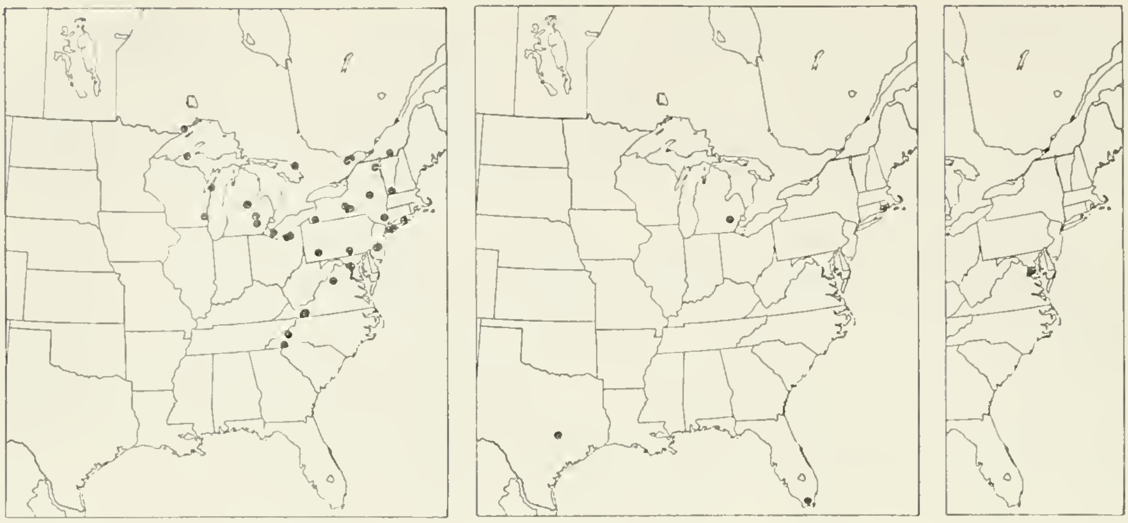
Our own collections were largely in fields overgrown with bushes and at the edges of woods. There are no host records on the pin labels of the specimens at hand, but Graenicher reared it from nests of *Ceratina dupla* and reported on its biology (1905, Ent. News, vol. 16, pp. 43–49). According to his observations, the egg of the parasite is laid in the cell of a bee, on top of the bee's egg. The parasite larva hatches first and for about 8 days, until the bee larva is about half grown, feeds very little. Then it feeds rapidly, killing this bee larva and invading one to four adjacent cells and consuming their larvae also. It then spins a flimsy cocoon, pupates, and becomes an adult, in all about 30 days from the time the egg hatched.

This species occurs in the Alleghanian Fauna.

5. Aritranis nubecula, new species

Front wing 4.5 to 6.5 mm. long; clypeus weakly, evenly convex, its apical margin very weakly arcuate and with a very weak blunt median tooth; thorax of moderate stoutness; mesoscutum somewhat mat, with medium sized, strong punctures; apical carina of propodeum strong, forming very weak sublateral crests, its median part bowed forward; areolet pentagonal, of moderate size; second recurrent forming a 90° angle with first abscissa of subdiscoideus; first tergite of moderate length, without a basolateral tooth but in female with a narrow rounded flange in lieu of a tooth; median dorsal carina of first tergite strong from base nearly to apex; dorsolateral carina of first tergite strong beyond the spiracle, weak basad; second tergite strongly mat, with medium sized, moderately strong punctures that are separated by about 0.7 their diameter; ovipositor sheath about 0.36 as long as front wing.

Male: Head black, the face, frontal orbit, cheek, clypeus, and lower 0.7± of temple white, more or less of the upper 0.3± of temporal orbit often fulvous; mouth parts white; antenna black, the scape light brown except above; thorax ferruginous, much of propleurum and prepectus, margins and notauli of mesoscutum, and area



Figures 43–45.—Localities: 43 (left), *Aritranis gracilis;* 44 (center), *A. nubecula;* 45 (right), *A. barberi.*

around scutellum and postscutellum, black; collar, often part of propleurum, often stripe on lower edge of pronotum, often hind corner of pronotum, tegula, subtegular ridge, scutellum, and postscutellum, white; most or all of front coxa, front and middle trochanters, and usually most of middle coxa white, the rest of these parts fulvous; front and middle legs beyond trochanters fulvous, the knees whitish, front tarsus pale fulvous but with its fifth segment brown, and middle tarsus mostly brownish; hind coxa, trochanter, and femur ferruginous; hind tibia brownish ferruginous, a little paler at base and beneath; hind tarsus white, the basal 0.4± of first segment and apical 0.3± of last segment dark brown; wings hyaline but with a faint suggestion of the color pattern of female; abdomen ferruginous, the sixth and following segments black, or sometimes the sixth segment mostly ferruginous.

Female: Dark ferruginous. Area around ocelli, part of occiput, and spot on clypeal fovea sometimes fuscous; palpi dark brown; antenna black, the scape ferruginous except above and the flagellum with an incomplete white band that covers about 3 segments; collar and scutellum white; tegula ferruginous; area around scutellum sometimes fuscous; front and middle tibiae sometimes darkened above, the middle tarsus darkened apically; hind tibia fuscoferruginous, paler basally; first and last segments of hind tarsus dark brown, the apex of first segment sometimes whitish; segments 2–4 of hind tarsus white; front wing with a fuscous cloud just basad of areolet and its apex infuscate; fourth tergite entirely ferruginous or partly infuscate; fifth tergite ferruginous or black; sixth and following segments black, the seventh tergite with a median apical transverse white mark.

Type: ♀, Navasota, Tex., Apr. 7, 1959, W. Mason (Ottawa).

Paratypes: ♀, Paradise Key, Fla., C. A. Mosier (St. Paul). ♂, Ann Arbor, Mich., June 16, 1959, H. and M. Townes (Townes). ♂, Westerly, R.I., July 4, 1936, M. Chapman (Townes). 4♂, same data as type (Ottawa).

6. Aritranis barberi, new species

Male type: Front wing 6.3 mm. long; clypeus exceptionally short, in profile very strongly convex, with a small median impression, its apical margin squarely truncate, without even a trace of a median point; thorax rather long; mesoscutum polished, with rather coarse, strong punctures, its notauli very strong; apical carina of propodeum strong throughout, its median 0.3 strongly bowed forward; areolet pentagonal, unusually small; angle of second recurrent with first abscissa of subdiscoideus about 100°; first tergite rather short, without a basolateral tooth, without distinct median dorsal carinae, its dorsolateral carina strong from base to spiracle, obsolescent between spiracle and apex; punctures on second tergite moderately large but very weak.

Head white, the median part of frons and vertex black, the dorsal half of head behind eyes black except near eyes; mouth parts white; antenna dark brown, paler below, the scape whitish in front; propleurum white, black dorsally; pronotum black, its upper and lower edges broadly white; mesoscutum black, with a median white spot; scutellum and postscutellum white, the adjacent areas black; mesopleurum fulvous, the subtegular ridge and a blotch above sternaulus white, an area just below and behind the subtegular ridge black; upper part of prepectus white, the rest fulvous and fuscous; mesosternum mostly whitish, brownish between the middle coxae; metasternum, metapleurum, and propodeum fulvous, the metapleurum with a large elliptic white spot dorsally and the propodeum with a narrow white band following the course of its apical carina; front and middle coxae and trochanters whitish with pale fulvous areas, the middle first trochanter brownish above; front and middle femora and tibiae fulvous, paler at the knees; front and middle tarsi whitish; hind coxa, trochanters, and femur fulvoferruginous, the first trochanter partly brown; hind tibia brownish ferruginous, paler below and near base; hind tarsus entirely white; abdomen uniformly fulvoferruginous.

The species name is a belated tribute to Mr. H. S. Barber's deep interest in insects, and to his careful and sometimes inspired studies. The type specimen was collected in his younger years, in his favorite spot. It remained unnoticed for more than half a century, until after his death. Some of his other contributions have had a similar history.

Type: ♂, collected at light, Plummers Island, Md., July 9, 1902, H. S. Barber (Washington, USNM 63758).

7. Aritranis albicollaris (Cresson), new combination

Front wing 5.2 to 9.5 mm. long; clypeus rather short, rather weakly convex, its apex a little impressed on each side of middle so that it appears to have a very weak, blunt, median tooth; thorax moderately elongate; mesoscutum polished, with rather coarse, strong, rather dense punctures; apical carina of propodeum sinuate, more or less bowed forward medially; areolet of moderate size, subpentagonal, definitely higher than wide, the intercubiti weakly convergent forward; second recurrent vein forming a 105° angle with first abscissa of subdiscoideus; first tergite rather short, without a basolateral tooth, without distinct median dorsal carinae but with faint ridges in their places; dorsolateral carina of first tergite rather strong and sharp for entire length of the tergite; postpetiole weakly mat, with a few scattered, rather small punctures; second tergite mat, with moderate sized, moderately strong punctures that are separated by about 0.3 their diameter in male, by about 0.4 their diameter in female; ovipositor sheath about 0.45 as long as front wing.

There are eastern and western subspecies, as keyed and described below:

1. Face white laterally, the rest black, or the face of male sometimes entirely white; seventh tergite black, in the female with a white apical margin; range: Atlantic Ocean to Rocky Mountains in Transition and Upper Austral zones. **7a. albicollaris albicollaris** (Cresson)

   Face entirely black; seventh tergite ferruginous, without a white margin; range: Washington to California . . . . **7b. albicollaris clypeata,** new subspecies

7a. Aritranis albicollaris albicollaris (Cresson)

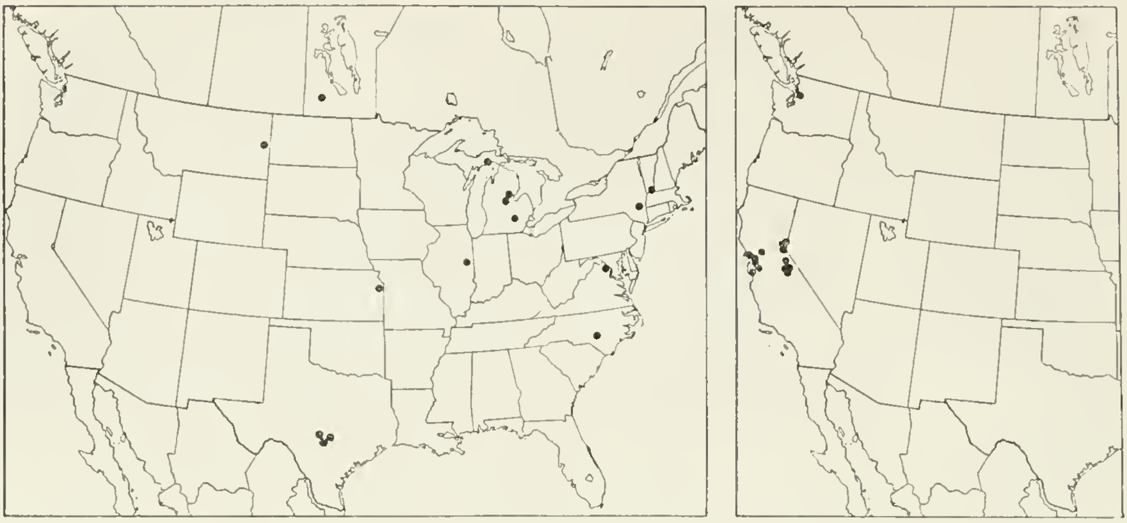
Cryptus albicollaris Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 158; ♀. Type: ♀, Comal Co., Tex. (Philadelphia).

Punctation a little coarser than in subspecies *clypeata,* especially on temple and on tergites 2 and 3; groove between face and clypeus moderately strong.

Male: Head black, the side of face, more or less of cheek, usually the frontal orbit, and clypeus white, sometimes most or all of face and lower part of temporal orbit white; mandible and palpi white; antenna black, its scape fulvous to black, often white in front; propleurum entirely white, partly white, or entirely black; pronotum ranging from black with its collar, hind corner, and part of lower edge white, to mostly white and fulvous with a central spot on each side fuscous; tegula white; mesoscutum entirely black to ferruginous with blackish sutural markings; scutellum and postscutellum white, the surrounding area black; mesopleurum ferruginous, the subtegular ridge white and an area below and behind the ridge black; thoracic sterna and lower part of prepectus partly or mostly black, the mesosternum often with a white stripe below the sternaulus; metapleurum and propodeum ferruginous; front and middle coxae white or fulvous, the front coxa sometimes fuscous; front and middle trochanters white, fulvous, or ferruginous, the first trochanters sometimes infuscate; front and middle legs beyond the trochanters fulvous, their tarsi brown apically; hind coxa, trochanters, and femur ferruginous, the apex of femur often more or less infuscate; hind tibia ferruginous brown, ferruginous basally and below; hind tarsus white, the basal 0.4± of first segment and apical 0.5± of last segment brown; abdomen ferruginous, black beyond the sixth segment, the sixth tergite usually with some basal infuscate areas.

Female: Head black, the facial orbit, clypeus, and sometimes frontal orbit and cheek, white; mandible white; palpi fuscous, often partly white basally; antenna black, the flagellum with an incomplete white band that covers about 4.5 segments; propleurum blackish, ferruginous or whitish ventrally; pronotum black, its hind corner, broad stripe along lower edge, and sometimes area around epomia, white; mesoscutum varying from entirely black to ferruginous with fuscous sutural marks; scutellum and postscutellum white, the surrounding area black; tegula white; mesopleurum ferruginous; subtegular ridge white, the area around subtegular ridge, or at least that behind and below, black; prepectus largely or mostly black; mesosternum and metasternum ferruginous, more or less infuscate medially; metapleurum and propodeum ferruginous; front and middle legs ferruginous, their coxae and trochanters a little paler, femora and tibiae often a little infuscate above, and their tarsi largely brown, darkest apically; hind coxa, trochanters, and femur ferruginous, the apical 0.15± of the femur infuscate; hind tibia ferruginous, infuscate apically; hind tarsus white, the basal 0.4± of first segment and all of fifth segment dark brown; abdomen ferruginous, its sixth to eighth tergites mostly or entirely fuscous, the apical membranous margins of the sixth and seventh tergites white. Sometimes the apex of the fifth tergite is fuscous.

Specimens: 6♂, reared from *Phlyctaenia tertialis*, Urbana, Ill., Feb. 25 and 29, 1928, Mar. 21, 1928, and Dec. 22, 1927, W. V. Balduf (Washington). ♂, ♀, Johnson Co., Kans., 1915, R. H. Beamer (Lawrence and Townes). ♂, Minnedosa, Man., June 7, 1926, R. M. White (Ottawa). ♀, Ann Arbor, Mich., July 22, 1959, H. and M. Townes (Ottawa). ♀, Gladwin Co., Mich., July 22, 1958, R. R. Dreisbach (Dreisbach). ♀, Midland Co., Mich., June 16, 1939, R. R. Dreisbach (Townes). ♂, Naubinway, Mich., June 7, 1957, H. Townes (Townes). ♀, Glendive, Mont., C. N. Ainslie (Washington). ♀, New Baltimore, N.Y., 1880 (New York). ♀, Southern Pines, N.C., Nov. 8, 1950, H. and A. Howden (Townes). ♂, Cascapedia, Que.,



FIGURES 46, 47.—Localities: 46 (left), *Aritranis albicollaris albicollaris;* 47 (right), *A. a. clypeata.*

June 16, 1933, W. J. Brown (Ottawa). ♂, Kerrville, Tex., Apr. 18, 1959, W. Mason (Ottawa). ♂, San Antonio, Tex., Apr. 3, 1947, H. and M. Townes (Townes). ♀, Laurel Lake, near Jacksonville, Vt., July 2, 1935, Harry D. Pratt (St. Paul). ♂, reared from cocoon under codlin moth band, Leesburg, Va., June 1, 1920, L. A. Stearns (Washington). ♂, no data (Townes).

This subspecies is known from widely scattered localities in the United States east of the Rocky Mountains and from Manitoba, Canada. It has been reared from *Phlyctaenia tertialis.*

7b. Aritranis albicollaris clypeata, new subspecies

Punctation a little finer than in subspecies *albicollaris,* especially on temple and on tergites 2 and 3; groove between face and clypeus rather weak.

Male: Black. Mandible and central part of clypeus pale yellow or fulvous; palpi whitish, brownish apically; scape blackish brown; collar, tegula, subtegular ridge, hind corner of pronotum, scutellum, and postscutellum, pale yellow, fulvous, or ferruginous; thorax often with ferruginous stains or areas of various extent, especially on metapleurum and propodeum; front and middle legs ferruginous, their tarsi brown apically; hind coxa, trochanters, and femur ferruginous; hind tibia and first two segments of hind tarsus ferruginous brown, the tibia ferruginous basally and below and the second tarsal segment with its apical 0.3± white; segments 3 and 4 of hind tarsus white, the fifth segment blackish; wings with a faint reddish brown tinge; abdomen uniformly ferruginous.

Female: Ferruginous. Head black, the clypeus fulvous; mandible fulvous; palpi dark brown; antenna black, the scape fulvous, and the flagellum with a white stripe above that covers 3 to 3.5 segments; most of sterna, upper part of propleurum, and area around scutellum fuscous; tarsi brown apically, the hind tarsus sometimes pale fulvous or whitish medially; wings with a ferruginous brown tinge. A female from Everett Lake, Washington, has the scape blackish brown and the clypeus black except for a median apical ferruginous stain.

Type: ♀, Tamarack Flat, Yosemite Park, Calif., July 24, 1948, H., M., G., D., and J. Townes (Washington, USNM 63759).

Paratypes: ♂, Berkeley, Calif., Apr. 29, 1934 (Townes). ♂, Berkeley, Calif., May 1, 1949, P. D. Hurd (Berkeley). ♂, Cathedral Lake, Tahoe, Calif., Feb. 6, 1915, E. P. Van Duzee (Berkeley). ♂, Dardanelle, Calif., July 8, 1948, H., M., G., D., and J. Townes (Townes). ♂, Felton, Calif., Sept. 6, 1908, J. C. Bradley (Ithaca). ♂, Fish Camp, Calif., July 11, 1948, H., M., G., and D. Townes (Townes). ♂, near Glacier Point, Yosemite Park, Calif., July 19, 1948, H., M., G., D., and J. Townes (Townes). ♂, Green Valley, Solano Co., Calif., May 28, 1948, R. M. Bohart (Townes). ♀, Lake Tahoe, Calif., July 1934, L. W. Saylor (Patuxent). ♂, Mill Valley, Marin Co., Calif., June 11, 1922, C. L. Fox (San Francisco). ♂, Mount Hamilton, Calif., Apr. 14, 1936 (Townes). ♂, Oakland, Calif., May 22, 1955, B. Hudson (Berkeley). ♂, Tallac Lake, Tahoe, Calif., Feb. 12, 1915, E. P. Van Duzee (Berkeley). ♀, Strawberry, Calif., June 28, 1948, H., M., G., D., and J. Townes (Townes). ♀, Lake Stephens, near Everett, Wash., Aug. 3, 1917, A. L. Melander (Cambridge).

This subspecies occurs in the Pacific States. It is adult mostly from spring to mid-summer. One specimen, however, was collected in September.

8. Aritranis notata (Provancher), new combination

Front wing 3.7 to 8.0 mm. long; clypeus weakly convex, with a strong, blunt, median point which is a little accentuated by a weak impression of the clypeal apex on each side; thorax of moderate slenderness; mesoscutum polished, with medium sized, strong, rather close punctures; apical carina of propodeum strongly sinuate, strongly bowed forward in the middle, sublaterally strengthened to form faint crests; areolet moderately small, irregularly pentagonal, the second intercubitus usually shortened; second recurrent forming a 105° angle with first abscissa of subdiscoideus; first tergite moderately long, without a basolateral tooth, its median dorsal carinae rather strong and sharp, fading at middle of postpetiole; dorsolateral carina of first tergite obsolescent a little basad of spiracle, elsewhere rather strong and sharp; postpetiole weakly mat, with sparse, scattered, small punctures; second tergite weakly mat, with medium-sized, rather strong punctures that are separated by about 0.2 their diameter; ovipositor sheath about 0.48 as long as front wing.

There are three subspecies, separable on color as keyed and described below:

1. Seventh tergite with a median apical white spot, except in some dwarf males (front wing 3.8 to 5.0 mm. long); second segment of hind tarsus usually entirely white; range: Atlantic Ocean to Rocky Mountains in Canadian, Transition, and Upper Austral zones. . . **8a. notata notata** (Provancher)
   Seventh tergite without a white spot; second segment of hind tarsus largely or entirely brown or fulvous. 2
2. Tergite 6 black; range: British Columbia and Montana to Oregon (also New Jersey?) . . . . **8b. notata newcomeri** (Cushman)
   Tergite 6 ferruginous; range: California . **8c. notata sierrae,** new subspecies

8a. Aritranis notata notata (Provancher)

Cryptus Belangeri Provancher, 1874, Naturaliste Canadien, vol. 6, p. 177, 201; ♀. New synonymy. Type: ♀, Quebec (lost).

Cryptus notatus Provancher, 1874, Naturaliste Canadien, vol. 6, p. 177, 202; ♂. Type: ♂, Quebec (Quebec).

Cryptus elongatus Provancher, 1882, Naturaliste Canadien, vol, 13, p. 362 (Faune, p. 340); ♂. Type: ♂, Quebec (Quebec).

Oronotus albomaculatus Ashmead, 1896, Trans. Amer. Ent. Soc., vol. 23, p. 205; ♂. Type: ♂, Texas (Washington).

Male: Head black, the side of face, short broad stripe on frontal orbit, clypeus, and cheek, white, sometimes the face mostly or entirely white and often the white on facial and frontal orbits narrowly connected; mouth parts white, the apices of palpi brownish; antenna black, the front of scape often marked with white; thorax black, the collar, tegula, subtegular ridge, some or all of scutellum, and usually the postscutellum, white; front and middle coxae entirely fulvous to mostly white; front and middle trochanters white, often partly fulvous; front and middle femora and tibiae fulvous, the apex of femur

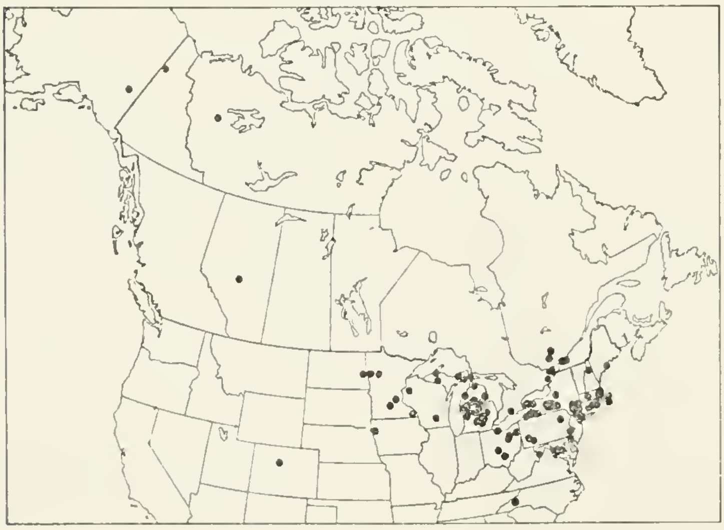


Figure 48.—Localities for *Aritranis notata notata.*

often narrowly white and base of tibia often stramineous; front and middle tarsi pale fulvous, their fifth segments brown; hind coxa, trochanters, femur, and tibia ferruginous, the tibia a little paler toward base and fuscous toward apex; first and last segments of hind tarsus blackish, the apical 0.3± of the first segment white; segments 2–4 of hind tarsus white; first 4 segments of abdomen ferruginous, the fifth entirely black or basally ferruginous, the sixth, seventh, and eighth black, the seventh with an elongate median apical white spot, or in some smaller specimens the white spot lacking.

Female: Head black, the clypeus usually white medially, sometimes ferruginous medially or entirely black; mandible blackish or more or less ferruginous; palpi dark brown; antenna black, the flagellum dark brownish basally and with a median white band, incomplete below, that covers about 4 segments; thorax black, the tegula blackish, the collar, small mark on subtegular ridge, scutellum at least centrally, and sometimes postscutellum, white; front and middle legs ferruginous, their trochanters, upper side of tibiae, tarsi apically, and the front coxa usually more or less infuscate; hind coxa, trochanter, and femur ferruginous, the apex of femur and the first trochanter often more or less infuscate; hind tibia fuscous, ferruginous basally; segments 1 and 5 of hind tarsus fuscous, the apex of first segment often paler; segments 2–4 of hind tarsus white, their apices often fulvous, or rarely these segments partly brownish; wings with a faint brown tinge; abdomen ferruginous, the fourth segment often partly or entirely black, the fifth and following segments black except for a median apical white spot on seventh tergite and usually a smaller median white spot on eighth.

Five females at hand are somewhat intermediate to the subspecies *newcomeri*, at least according to the key characters, but seem best placed under *notata*. These are: one from Niagara Glen, Ont., with segments 2–4 of hind tarsus light brown and the white spots on tergites 7 and 8 obsolescent; one from Edmonton, Alta., with the second segment of hind tarsus dark brown, but with some faint white blotches and with normal sized white spots on tergites 7 and 8; two from Boulder Canyon, Colo., with segments 2–4 of hind tarsus medium brown, 1 of them with normal-sized white spots on tergites 7 and 8, and 1 without spots; and one from Colorado with segment 2 of hind tarsus dark brown, segments 3 and 4 pale brown, and the white spots on tergites 7 and 8 rather small.

There is in the Provincial Museum of Quebec a specimen, labeled "type" of *Cryptus belangeri*, that is *Gambrus canadensis.* It does not, however, fit the original description, which calls for the scutellum, segments 2–4 of hind tarsus, and spots on last two abdominal tergites being white. In these and in other characters mentioned in the original description, *Cryptus belangeri* agrees with *A. notata notata.*

Specimens (101♂, 84♀): From Alaska (Big Delta); Alberta (Edmonton); Colorado (Boulder Co.); Connecticut (Salem and South Meriden); Delaware (Newark); Iowa (Sioux City); Maine ("Carrs" and Lincoln Co.); Maryland (Glen Echo and Patuxent Refuge near Bowie); Massachusetts (Blue Hills, Cohasset, Nantucket, Reading, and South Hadley); Michigan (Alston, Ann Arbor, Brevort, Clare Co., Douglas Lake, East Lansing, Genesee Co., George Reserve in Livingston Co., Gratiot Co., Huron Co., Iosco Co., Iron Co., Kalkaska Co., Kent Co., Leelanau Co., Mason Co., Mecosta Co., Midland Co., Muskegon Co., Naubinway, Newaygo Co., Roscommon Co., Schoolcraft Co., and Wexford Co.); Minnesota (Houston Co., Itasca Park, Norman Co., St. Peter Fish Hatchery, and Zumbra Heights in Carver Co.); New Hampshire (Mount Lafayette at 5,200 ft.); New Jersey (Alpine); New York (Bemus Point, Cold Spring Harbor, Connecticut Hill near Ithaca at 2,000 ft., Copake Falls, Enfield Falls in Tompkins Co., Greene Co., Hamburg, Ithaca, Lockport, Ludlowville, Otto, Poughkeepsie, Rock City in Cattaraugus Co., Shokan, between Slaterville and Caroline, Syracuse, Van Natta's Dam near Ithaca, and West Farms in New York City); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft.); North Dakota (Trail Co.); Northwest Territories (Norman Wells); Ohio (Akron, Barberton, Cantwell Cliffs, Columbus, East Harbor, and Trumbull Co.); Ontario (Dow's Swamp near Ottawa, Gananoque, Jordan, Niagara Glen, Ottawa, Rockcliffe near Ottawa, and Tillsonburg); Pennsylvania (Philadelphia, Pittsburgh, Spring Brook, and Westmoreland Co.); Quebec (Burbidge, Kazabazua, La Trappe, and Montreal); Rhode Island (Ashaway and Westerly); Virginia (Barcroft and Great Falls); West Virginia (Lost River State Park in Hardy Co.); Wisconsin (Madison and south of Shell Lake in Washburn Co.); and Yukon (Rampart House).

Dates of collection range from mid-spring to early fall. Unusually early and late records are: May 4 at Cantwell Cliffs, Ohio; May 5 at Rock City, Cattaraugus Co., New York; May 14 in Wexford Co., Mich.; May 16 at South Hadley, Mass.; May 17 at Spring Brook, Pa.; September 18 at Zumbra Heights, Carver Co., Minn.; September 20 and 22 at Ann Arbor, Mich.; September 25 at Ottawa, Ont.; and October 16 at Bowie, Md.

Specimens with host data are as follows: 2♀, reared from "*Odynerus*" nest in *Rhus* stem, collected Feb. 17, 1935, emerged Mar. 12, 1935, J. C. Bridwell. ♀, reared from *Ancistrocerus birenimaculatus*, Connecticut. ♀, reared from *Oberea* sp. in *Rhododendron*, Great Falls, Va., June 22, 1917, F. C. Craighead.

This subspecies occurs east of the Rocky Mountains, in the Canadian and Transition zones.

8b. Aritranis notata newcomeri (Cushman), new status, new combination

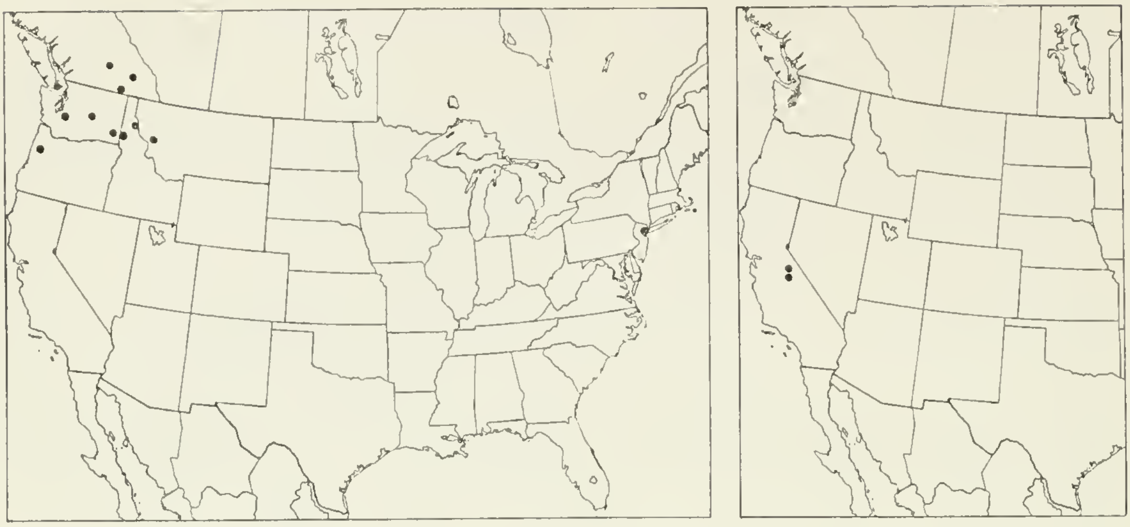
Caenocryptus newcomeri Cushman, 1917, Proc. U.S. Nat. Mus., vol. 53, p. 463; ♂, ♀. Type: ♀, Wenatchee, Wash. (Washington).

Male: Colored like male of the subspecies *notata* except that white markings on head average a little less extensive, front and middle coxae average less white and more ferruginous, and hind tibia and basitarsus are a little less strongly infuscate. The second segment of hind tarsus is sometimes entirely brown but usually is brown with its apical 0.25± white; the fifth tergite ranges from entirely black to entirely ferruginous and the seventh tergite is always entirely black. In one male from Saanich District, B.C., the coxae and hind first trochanter are black, and the apex of front and middle coxae black.

Female: Black. Mandible and median part of clypeus stained with ferruginous; palpi fuscous; antenna black, the flagellum dark brown basally, two or three of its median segments white above; tegula dark brown; front and middle legs ferruginous, their fifth tarsal segments brownish ferruginous; hind leg ferruginous, its tibia a little darkened apically, its tarsus uniformly brownish fulvous and last tarsal segment brown; wings with a weak fuscous tinge; abdomen ferruginous, its fourth and following tergites entirely black or the fourth one partly ferruginous.

Specimens: ♂, Kaslo, B. C., July 8, R. P. Currie (Washington). 2♂, Robson, B.C., May 25 and Aug. 13, 1949, H. R. Foxlee (Ottawa). ♂, Saanich District, B.C., June 7, 1929, W. Downes (Ottawa). ♀, Salmon Arm, B.C., July 30, 1925, A. A. Dennys (Ottawa). ♀, Moscow, Idaho, July 24, 1925, C. L. Fox (San Francisco). ♀, Wallace, Idaho, Aug. 13, 1937, Otto Huellemann (St. Paul). ♀, Missoula, Mont., July 1, 1940, H. K. Townes (Townes). 2♀, reared from *Allantus cinctus*, Madison, N.J., Mar. 8 and 10, 1938, J. C. Silver (Washington). ♀, Corvallis, Oreg., June 20, 1935, G. Ferguson (Corvallis). ♂, Ashford, Wash., July 27, 1940, H. and M. Townes (Townes). ♂, Union Flat [Cr.], Wash., July 16, 1916 (Cambridge). 9♂, 17♀, reared from *Ametastegia glabrata*, Wenatchee, Wash., Apr. 10 to June 18, 1915 and 1917, E. J. Newcomer (Washington, Townes, and Ottawa).

This subspecies occurs in the Transition zone of northwestern United States and southwestern Canada. One long series, including the types, was reared from a sawfly pupating in weed stems. Two specimens recorded above from "Madison, N.J." are either mislabeled or indicate that the subspecies is colonized in the East.



FIGURES 49, 50.—Localities: 49 (left), *Aritranis notata newcomeri;* 50 (right), *A. n. sierrae*

8c. Aritranis notata sierrae, new subspecies

Male: Head black, the facial orbit broadly, a narrow stripe on frontal orbit, cheek, clypeus except marginally, and mouth parts, white; antenna black, a small mark on front of scape white; thorax black, the collar, tegula, small mark on subtegular ridge, and apex of scutellum white; front and middle legs pale ferruginous, their trochanters whitish and fifth tarsal segments light brown; hind leg ferruginous, its tibia a little darkened apically, first two tarsal segments fuscous, next two white, and last tarsal segment black; wings faintly infuscate; abdomen ferruginous, black beyond the sixth tergite.

Female: Black. Clypeus with a ferruginous stain; mandible fusco-ferruginous; palpi fuscous; antenna black, sometimes with upper side of one of the median flagellar segments white; subtegular ridge and sometimes collar, scutellum, and restricted areas on mesopleurum, metapleurum, and propodeum, with ferruginous stains; tegula blackish; front and middle legs ferruginous, their fifth tarsal segments brown; hind leg ferruginous, its tibia faintly darkened apically, its fifth tarsal segment brownish ferruginous; wings weakly infuscate; abdomen ferruginous, the apical half of eighth tergite infuscate.

Type: ♀, Fish Camp, Calif., July 15, 1948, H., M., G., and D., Townes (Washington, USNM 63760).

Paratypes: ♀, Crane Flat, Yosemite Park, Calif., July 22, 1948, H., M., G., D., and J. Townes (Townes). ♂, same data as type but dated July 12, 1948 (Townes).

9. Aritranis imitator (Provancher), new combination

Front wing 4.6 to 7.8 mm. long; clypeus weakly convex, with moderately coarse, scattered punctures, its apical margin almost straight but projecting medially as a tooth, impressed on each side of the middle so as to accentuate the median tooth; thorax short and stout; mesoscutum polished, its punctures moderately small, sharp; mesopleurum subpolished and with medium-sized, strong punctures and in places some wrinkling that obscures the punctures; apical carina of propodeum evenly, strongly arcuate, not strongly produced forward medially but sometimes a little sinuate; areolet unusually large, its sides only weakly convergent forward, receiving second recurrent vein before the middle; second recurrent vein making a 95° angle with subdiscoideus; first abdominal segment longer and more slender than in any other Nearctic species, without a basolateral tooth, its median dorsal carinae blunt, extending a little past spiracles, its dorsolateral carinae strong and sharp throughout; postpetiole weakly mat, with some scattered and partly grouped, moderately coarse punctures; second tergite mat, with medium sized strong punctures that are separated by about 0.7 their diameter; ovipositor sheath about 0.60 as long as front wing.

Adults occur only from late spring to mid-summer, which indicates a single generation each year.

This species is represented by four subspecies, which differ in color as keyed and described below. It is closely related to the European (*Cryptus*) *Aritranis quadriguttata* (Gravenhorst, 1829), new combination. *A. quadriguttata* differs from *imitator* in having the male flagellum flattened at the tyloids and the mesopleurum wrinkled but without distinct punctures.

1. Second and third tergites black, their apical margins usually narrowly ferruginous; range: transcontinental in the Canadian and Hudsonian zones.
9a. imitator nigriventris, new subspecies
Second and third tergites entirely ferruginous 2
2. Seventh tergite with a median white spot, the spot often very small; apical 0.12± of hind femur at least faintly infuscate, in some females the hind femur largely infuscate; range: Atlantic Ocean to Rocky Mountains in Canadian and Transition zones . . **9b. imitator imitator** (Provancher)
Seventh tergite without a median white spot; apex of hind femur not infuscate 3
3. Fifth tergite black; basal half of first abdominal segment more or less infuscate, especially in males; apical part of female abdomen black; range: Alberta, British Columbia, Washington, Oregon, and Idaho.
9c. imitator monticola, new subspecies
Fifth tergite ferruginous, or in male sometimes partly infuscate; basal half of first abdominal segment not infuscate; apical part of female abdomen ferruginous; range: California . . **9d. imitator ruficauda,** new subspecies

9a. Aritranis imitator nigriventris, new subspecies

Coloration as in the subspecies *imitator* and *monticola* except that abdomen is black, the narrow apical margin of second tergite, sometimes thyridiae, and sometimes narrow apical margin of third tergite, ferruginous.

This form shows some regional variation that parallels the differences between the subspecies *imitator* and *monticola.* Specimens from the East have a white spot on the seventh tergite and apex of hind femur infuscate, while those from the West lack the white anal spot, and often lack infuscation on the apex of hind femur, and tend toward reduction of white on the flagellum and hind tarsus. Specimens from the far Northwest tend to be intermediate between the eastern and western varieties. If more specimens from more localities were at hand, it might have been feasible to subdivide the "subspecies" *nigriventris* or there might have been a more definite indication that this "subspecies" is only a color phase of both *imitator* and *monticola,* with a tendency toward more northern distribution.

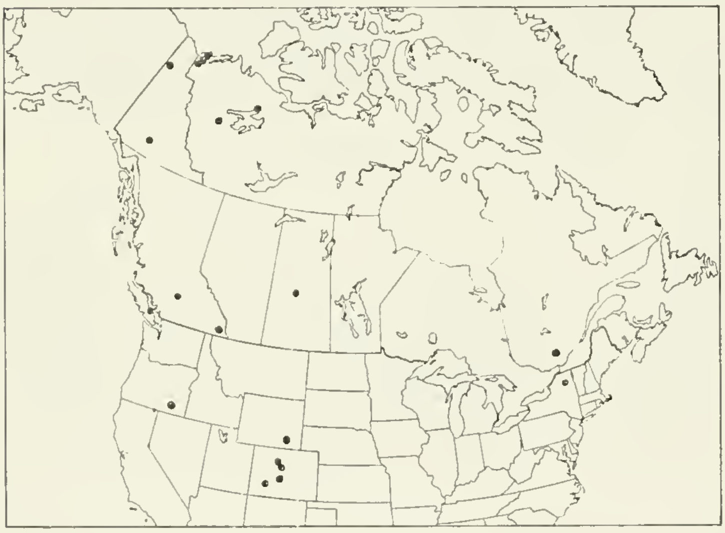


FIGURE 51.—Localities for *Aritranis imitator nigriventris.*

Type: ♀, near Estes Park, Colo., June 12, 1948, H., M., G., D., and J. Townes (Washington, USNM 63761).

Paratypes (11♂, 13♀): From British Columbia (Bowser, Fernie, and Pavillion Lake); Colorado (Boulder, near Estes Park, Florissant, and Sargents); New York (Saranac Lake); Northwest Territories (Aklavik, Fort McPherson, near Cameron Bay on Great Bear Lake, Norman Wells, and Reindeer Depot on Mackenzie Delta); Oregon (Blitzen River in Steens Mts. at 7,000 ft.); Quebec (Montigny); Saskatchewan (Waskesiu); Wyoming (Albany Co.); and Yukon (Rampart House and Whitehorse).

Most dates of capture are in June and July. Those outside of these two months are: May 1 at Boulder, Colo.; May 29 at Bowser, B. C.; August 1 at Cameron Bay, Great Bear Lake, N. W. T.; and August 11 in Albany Co., Wyo.

This subspecies is transcontinental in the Canadian and Hudsonian zones.

9b. Aritranis imitator imitator (Provancher)

Cryptus imitator Provancher, 1877, Naturaliste Canadien, vol. 9, p. 13; ♀. Type: ♀, Quebec (Quebec).

Male: Black. Broad orbital stripe on face that extends on to cheek, large median oval spot on face, clypeus except apical margin, mandible except apically, and palpi white, the palpi brownish apically; tegula dark brown, its outer edge usually white; trochanters apically often with ferruginous tinges; front and middle femora and tibiae ferruginous, the knees and front side of tibiae paler; front and middle tarsi pale stramineous, their fifth segments light brown; hind femur ferruginous, its apical 0.12± faintly to moderately infuscate; hind tibia dark brown, ferruginous basally; hind tarsus white, the basal 0.25± of its first segment and apical 0.25± of its last segment dark brown; wings faintly infuscate; abdomen ferruginous, fifth segment sometimes black, the sixth and following segments always black, the seventh with a median apical white spot, sometimes the sixth tergite with a smaller median apical spot.

Female: Black. Clypeus and mandible usually with a ferruginous stain; flagellum with a median white stripe above that covers about 3.5 segments; palpi fuscous; tegula very dark brown; front and middle legs beyond trochanters ferruginous, the fifth segments of their tarsi ferruginous brown; hind femur ferruginous, its apical 0.12± faintly to strongly infuscate, sometimes most of the femur infuscate; hind tibia dark brown, ferruginous basally; first and last segments of hind tarsus dark brown, the rest white, often the apex of first segment and base of last also white; wings weakly infuscate; abdomen ferruginous, its fifth segment often more or less infuscate, its sixth and following segments black, the seventh and sometimes also the eighth with a small or very small median white spot.

Specimens (22♂, 42♀): From Alberta (Clymont); Connecticut (Cornwall); Maine (Bangor, Northeast Harbor, and Lincoln Co.); Michigan (Bay Co., Clare Co., East Lansing, Kalkaska Co., Missaukee Co., Naubinway, and Rudyard); Minnesota (Grand Rapids, Itasca Park, Mille Lacs Co., Plummer, and St. Anthony Park); New Brunswick (Pokemouche); New Hampshire (Carriage Road on Mount Washington and Jaffrey); New York (Bemus Point, Breesport, Coy Glen near Ithaca, Hamburg, Ithaca, Oneonta, Rochester, and Taughannock near Ithaca); Nova Scotia (Truro); Ohio (Brecksville); Ontario (Jockvale, Parry Sound, and Smoky Falls on Mattagami River); Quebec (Aylmer, Hull, Ile de Montréal, La Trappe, Montreal, Nominingue, Ste. Anne des Monts, and St. Hilaire); Rhode Island (Westerly); Vermont (Laurel Lake near Jacksonville); and Wisconsin (Madison, Platteville, and Worden Township in Clark Co.).

Most dates of collection are between June 1 and July 8. Those outside of this range are: May 9 at Brecksville, Ohio; May 20 at Madison, Wis.; May 21 at Jaffrey, N. H.; May 25, 29, and 31 at Ithaca, N.Y.; May 28 at Jockvale, Ont.; July 14 at Parry Sound Ont.; and July 20 in Lincoln Co., Maine

This subspecies ranges from Maine to Connecticut and west to Minnesota.

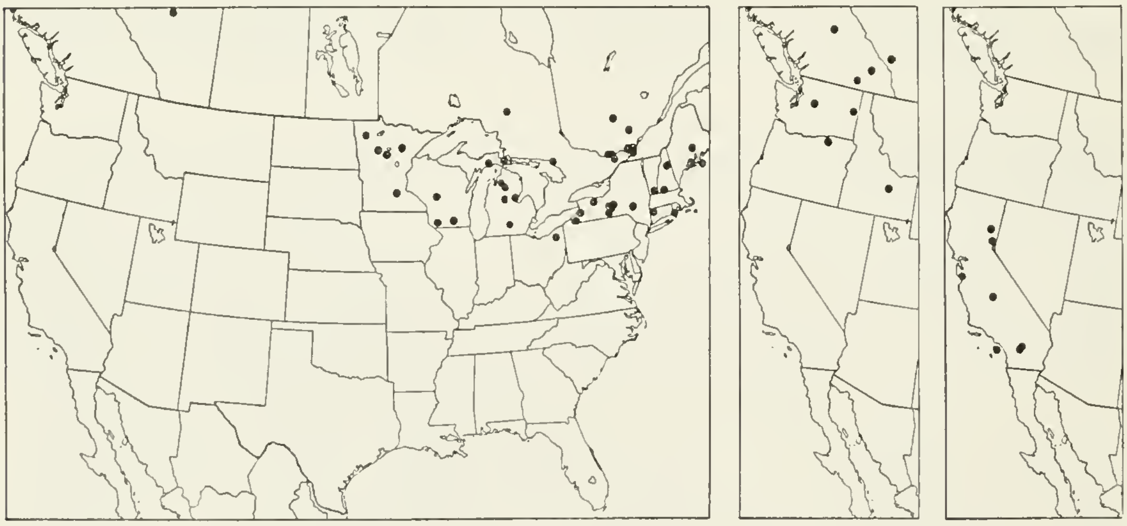
9c. Aritranis imitator monticola, new subspecies

Male: Colored like male of subspecies *imitator*, except that apex of hind femur is not at all infuscate, hind tibia a little paler and with a more ferruginous hue, hind basitarsus usually mostly or entirely dark brown, first abdominal segment infuscate on at least its basal half, fifth tergite always black, and seventh tergite lacks the white spot.

Female: Colored like female of subspecies *imitator* except that white mark on flagellum covers only 1 to 3 segments, apex of hind femur is not infuscate, hind tibia is of a paler, more ferruginous hue, first and last segments of hind tarsus usually entirely brown, segments 2–4 of hind tarsus often more or less brownish, base of first abdominal segment infuscate, and abdomen is entirely black beyond the third or fourth segment.

Type: ♀, Wenatchee Mts., Wash., July 9, 1930, A. R. Rolls (Washington, USNM 63762).

Paratypes: ♀, Norquay Mountain Meadows, 5,000 to 6,000 ft., Banff, Alta., July 20, 1925, Owen Bryant (Washington). ♀, Canim Lake, B.C., June 22, 1938, J. K. Jacob (Ottawa). 2♂, Carbonate on the



Figures 52–54.—Localities: 52 (left), *Aritranis imitator imitator;* 53 (center), *A. i. monticola;* 54 (right), *A. i. ruficauda.*

Columbia River at 2,600 ft., B.C., July 7, 1912, J. C. Bradley (Ithaca). 4♂, 1♀, Robson, B.C., May 20, 1949, May 24, 1947, June 21, 1945, June 29, 1950, and July 9, 1945, H. R. Foxlee (Townes and Ottawa). ♀, Bear Pass Creek, Butte Co., Idaho, July 26, 1947 (Townes). ♂, Wild Horse Mt., Athena, Oreg., May 14, 1938, Shuh and Gray (Corvallis). ♀, Denison, Wash., July 11, C. G. Tanner (Washington).

This subspecies occurs in the northwestern United States and southwestern Canada. It is adult from late spring to mid-summer.

9d. Aritranis imitator ruficauda, new subspecies

Male: Black. Facial orbit broadly white, the white extending on to cheek; broad median stripe on cheek, and clypeus white, these white areas and the orbital mark sometimes fused so that face is mostly or entirely white; mandible white, its apical part dark brown; palpi white, their apices brownish; tegula blackish, with a white mark basolaterally; femora ferruginous, the extreme apex of front and middle femora often white; front and middle tibiae and tarsi fulvous, the fifth tarsal segments light brown; hind tibia ferruginous, somewhat darkened apically; first and last segments of hind tarsus dark brown, the first segment often white apically and the last segment often white basally; segments 2–4 of hind tarsus white; wings faintly infuscate; abdomen ferruginous, the sixth and following segments black, the fifth segment sometimes partly infuscate.

Female: Black. Clypeus and mandible sometimes with a ferruginous tinge; flagellum with a median white stripe above that covers about 3.5 segments; palpi fuscous; tegula black; front and middle legs beyond trochanters ferruginous, their fifth tarsal segments brown; hind femur and tibia ferruginous; first and last segments of hind tarsus ferruginous brown, sometimes the apex of first segment and base of last segment white; segments 2–4 of hind tarsus white; wings weakly infuscate; abdomen entirely ferruginous.

Type: ♀, Pebbly Beach, Catalina Island, Calif., Apr. 2, 1938, W. P. Cockerell (San Francisco).

Paratypes: ♂, Donner Pass, Calif., Aug. 1, 1948, H., M., G., and D. Townes (Townes). ♂, Gold Lake, Sierra Co., Calif., July 11, 1921, C. L. Fox (San Francisco). ♀, Keen Camp, San Jacinto Mts., Calif., June 1, 1939, E. S. Ross (Townes). 2♀, Mineralking, Calif., Aug. 4 and 10, 1939 (Berkeley). ♂, 9 miles east of Soquel, Calif., July 4, 1956, S. M. Fidel (Davis). ♂, Tahquitz Valley, San Jacinto Mts., Calif., June 1, 1940, C. D. Michener (Townes).

This subspecies occurs in California.

6. Genus Pycnocryptus

FIGURE 311,a

Pycnocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 500. Type: (*Ichneumon peregrinator* Gravenhorst) = *director* (Thunberg); monobasic.

Front wing 3.7 to 9.0 mm. long; thorax of moderate proportions or somewhat elongate; frons unarmed; clypeus of medium size or moderately large, rather weakly to rather strongly convex, its apical margin broadly convex, with or without a median tooth; mesoscutum moderately long and convex; notaulus sharp, reaching or surpassing center of mesoscutum; epomia absent or very weak; prepectal carina ending just above middle of hind margin of pronotum or continued dorsad to reach or almost reach the subtegular ridge; propodeum moderately long, its transverse carinae weak to moderately strong, often obsolete or obsolescent medially, the median portion of both bowed forward, the apical carina sometimes forming a weak sublateral crest; propodeal spiracle circular or elliptic; areolet of moderate size, pentagonal; second recurrent vein strongly sinuate and reclivous; discocubital vein only weakly arched, without a distinct ramellus; nervulus opposite basal vein; mediella moderately arched; nervellus broken far below the middle; axillus close to anal margin; first abdominal segment moderately stout, its spiracle well beyond the middle; postpetiole moderately widened and strongly convex above; first tergite lacking a lateral subbasal tooth, its median dorsal carinae present, not strong but traceable to a little distad of spiracle, its dorsolateral carina absent or indistinct basad of the spiracle, its ventrolateral carina moderately strong; second tergite mat or polished, with moderately dense punctures; ovipositor sheath 0.7 to 1.7 as long as front wing; ovipositor weakly compressed, its tip rather elongate, the teeth on its lower valve rather numerous, oblique or subvertical.

Pycnocryptus contains two species in Europe, a number in China (undescribed), and four in North America. One of the North American species is the European *Pycnocryptus director*, introduced into our country and become extremely common since 1938.

Key to the Nearctic species of Pycnocryptus

1. Clypeus weakly convex, with a median apical point; prepectal carina obsolete or obsolescent above middle of hind margin of pronotum; hind coxa black; hind femur fulvoferruginous . . . . **1. platyaspis,** new species
   Clypeus moderately convex, without a median apical point; prepectal carina complete dorsad to subtegular ridge 2
2. Coxae fulvous . . . . **3. alexanderi,** new species
   Coxae black 3
3. Tergites 5–7 ferruginous; tergite 2 of female mat and punctate; hind femur of female black . . . . **2. freemani,** new species

Tergites 5–7 mostly or entirely black; tergite 2 of female polished and punctate; hind femur of female almost entirely ferruginous.
4. **director** (Thunberg)

1. Pycnocryptus platyaspis, new species

Male: Unknown.

Female: Front wing 7.2 to 9.0 mm. long; cheek unusually long; clypeus large, weakly convex, the groove separating it from face indistinct, with a median apical point; thorax rather short; notaulus shallow, weakly foveolate; punctures on mesopleurum more or less confluent, often obscured by rugulosity; basal carina of propodeum weak or incomplete; median part of apical carina of propodeum weak or absent; median part of both transverse carinae of propodeum, when present, strongly arched forward; sides of areolet weakly convergent; second tergite mat, with medium-sized punctures that are separated by about 1.5 their diameter; ovipositor sheath about 0.70 as long as front wing; ovipositor tip more compressed and with more widely spaced teeth than usual.

Black. Hairs on head dark brown; legs beyond trochanters fulvo-ferruginous; wings light brown; abdomen beyond first segment ferruginous.

Type: ♀, Great Whale River, Que., July 13, 1949, J. R. Vockeroth (Ottawa).

Paratypes: 2♀, Gillam, Man., July 8 and 11, 1950, J. F. McAlpine (Ottawa). 4♀, same data as type (Ottawa). ♀, Mount Washburn, Yellowstone Park, Wyo., C. T. Brues (Cambridge).

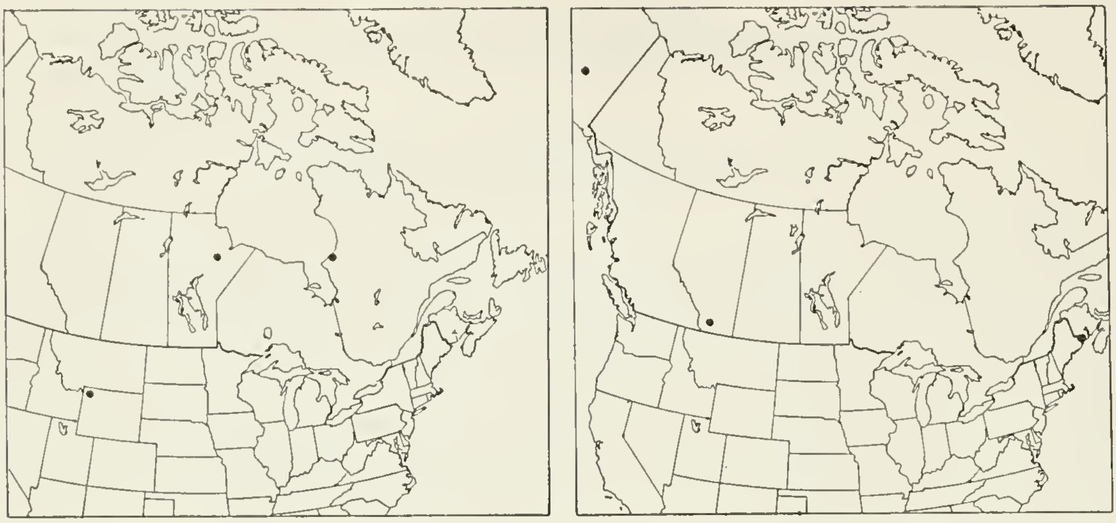
2. Pycnocryptus freemani, new species

Male: Unknown.

Female: Front wing 5.2 to 6.5 mm. long; clypeus moderately convex, without a median tooth; notaulus sharp, not foveolate; mesopleurum subpolished, with rather coarse punctures that are separated by about 0.5 their diameter, but in some areas the punctures crowded to produce rugulosity; transverse carinae of propodeum rather weak, obsolescent medially, their median portions rather broadly and strongly bowed forward; sides of areolet moderately convergent; second tergite mat, with small shallow punctures that are separated by 0.7 to 1.5 their diameter, the punctures a little sparser apically than elsewhere: ovipositor sheath about 0.80 as long as front wing.

Black. Mandible tinged with ferruginous apically; front tibia and apical 0.5± of front femur fulvous; front and middle tarsi and middle tibia blackish brown; wings weakly infuscate; abdomen red, its first segment fuscous basally.

Type: ♀, Waweig, N. B., June 27, 1938, T. N. Freeman (Ottawa).



Figures 55, 56.—Localities: 55 (left), *Pycnocryptus platyaspis;* 56 (right), *P. freemani.*

Paratypes: 2♀, Big Delta, Alaska, June 4 and 24, 1951, W. R. M. Mason (Ottawa). ♀, Lethbridge, Alta., June 24, 1956, O. Peck (Ottawa).

3. Pycnocryptus alexanderi, new species

Male type: Front wing 5.7 mm. long; clypeus moderately convex, without a median tooth; thorax of moderate proportions; notaulus weak, foveolate; mesopleurum polished, with a little weak wrinkling and with rather coarse punctures that are separated by about 0.7 their diameter; transverse carinae of propodeum both strong, complete, and bowed forward a little at center; sides of areolet moderately convergent; second tergite weakly mat, its punctures of moderate size, shallow, separated by about 1.6 their diameter.

Black. Facial orbit, most of cheek, short orbital mark at top of frons, clypeus, mandible, palpi, narrow hind corner of pronotum, tegula, subtegular ridge, scutellum, postscutellum, narrow hind corner of metapleurum, and apical carina of propodeum, yellow; scape fulvous; flagellum with a red-brown tinge beneath; legs fulvous, the apex of front and middle coxae marked with yellowish, upper side of first trochanters fuscous, and hind tibia and tarsus with a pale brown tinge; wings hyaline; abdomen fulvous, the basal half of its first segment yellow and the fifth and following segments darkened.

Female: Unknown.

Type: ♂, Lake Willoughby, 1,200 ft., Vt., June 17 to 29, 1945, C. P. Alexander (Washington, USNM 63763).

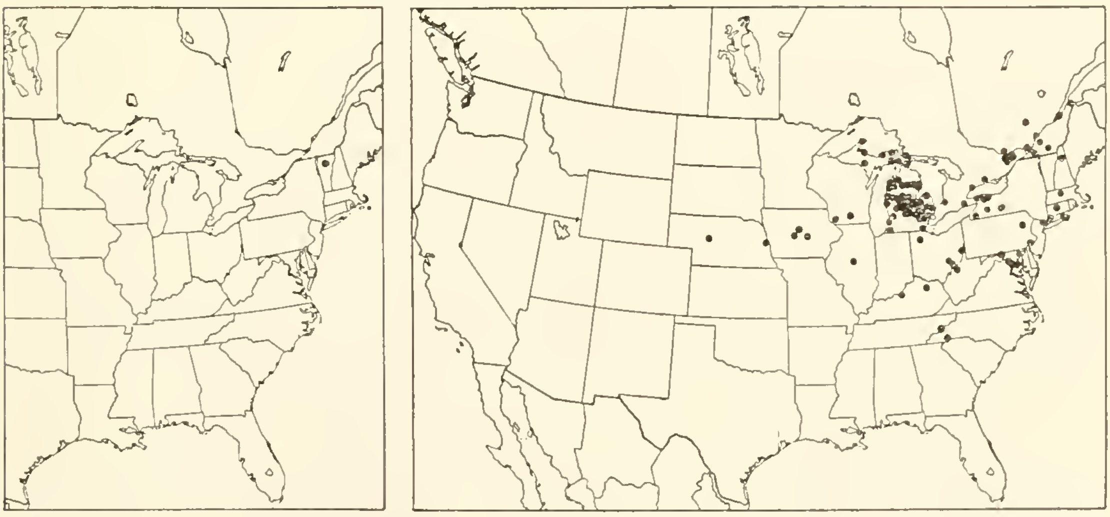
4. Pycnocryptus director (Thunberg)

Ichneumon director Thunberg, 1822, Mém. Acad. Sci. St. Pétersbourg, vol. 8, p. 270; ♂. Type: ♂, [Europe] (Uppsala).

Front wing 3.7 to 7.5 mm. long; clypeus moderately convex, without a median apical tooth; notaulus sharp, not foveolate; mesopleurum polished, with rather coarse, strong punctures that are separated by less than their diameter; transverse carinae of propodeum moderately strong, weaker or obsolescent medially, the median part of both rather strongly arched forward; sides of areolet moderately convergent; second tergite of male weakly mat, with small, very weak, close punctures; second tergite of female polished, with small sharp punctures that are separated by about 2.5 their diameter; ovipositor sheath about 0.80 as long as front wing.

Male: Black. Facial orbit sometimes with a narrow whitish stripe; tegula black; front and middle tibiae, apical 0.3 to 0.8 of front femur, apical 0.1 to 0.6 of middle femur, usually apical 0.15± of first abdominal segment, all of second to fourth segments, and basal part of fifth segment, fulvoferruginous; front tarsus fulvoferruginous, infuscate apically; middle tarsus dark brown; hind femur fulvous at extreme base, sometimes with extensive fulvoferruginous tinges, rarely mostly fulvous; fourth and fifth segments of hind tarsus often partly to entirely white, especially in larger specimens; third segment of hind tarsus sometimes white apically; wings subhyaline.

Female: Black. Antenna often with a brownish tinge basally; flagellum with about 4 premedian segments white above; femora, front and middle tibiae, apical 0.1 to 0.5 of first abdominal segment, all of second and third segments, fourth segment basally to almost entirely, and often fifth segment basally, fulvoferruginous, the front and middle femora blackish at base and the hind femur weakly infuscate at base and strongly infuscate at apex (sometimes the hind femur is more extensively infuscate); front and middle tarsi brownish fulvous, a little darker apically; hind tibia brownish fulvous, its apical 0.12± infuscate; hind tarsus fuscous, paler at the incisures; wings weakly infuscate; intersegmental membranes of apical part of abdomen usually showing as whitish areas.



Figures 57, 58.—Localities: 57 (left), *Pycnocryptus alexanderi;* 58 (right), *P. director.*

Specimens (891♂, 163♀): From Connecticut (East Hartford and Greenwich); District of Columbia (Washington); Illinois (Mount Pulaski); Iowa (Jewell, Ledges State Park in Boone Co., and Marshalltown); Kentucky (Elizaville and Louisville); Maine (Lincoln Co.); Maryland (Patuxent Reserve near Bowie, Ruxton, Takoma Park, and Thomas Road near Cumberland); Massachusetts (Petersham); Michigan (Allegan Co., Ann Arbor, Antrim Co., Arenac Co., Bath, Benzie Co., Berrien Co., Big Rapids, Brevort, Chatham, Clare Co., Clawson, Copper Harbor, Dickinson Co., East Lansing, Eaton Co., Genesee Co., George Reserve in Livingston Co., Gratiot Co., Huron Co., Huron Mts., Iona Co., Iosco Co., Isabella Co., Kent Co., Lake Co. Lake Orion, Lapeer Co., Luce Co., Mackinac Island, Manistee Co., Midland Co., Missaukee Co., Monroe Co., Montcalm Co., Naubinway, Oceana Co., Ogemaw Co., Osceola Co., Owosso, Roscommon Co., Saginaw Co., St. Clair Co., Sault Sainte Marie, Sharon Township in Washtenaw Co., South Haven, Tuscola Co., Wexford Co., and Ypsilanti); Nebraska (Hooker Co. and Omaha); New Brunswick (Maugerville and Pokemouche); New Hampshire (Randolph); New Jersey (Alpine); New York (Bemus Point, Castile, Gasport, Hamlin, Medina, Orient, Sag Harbor, Six Mile Creek near Ithaca, South Hill near Ithaca, and Youngstown); North Carolina (Mills River); Ohio (Bridgeport, Holgate, Layman, and Marietta); Ontario (Bells Corners, Brittania, Grand Bend, Manotick, Marmora, Merivale, Ottawa, Rockcliffe near Ottawa, Simcoe, Stittsville, and Swansea near Toronto); Pennsylvania (Spring Brook and Swarthmore); Prince Edward Island (East Point); Quebec (Grandy, Ile d'Orleans, Knowlton, La Trappe, Laurentides Park, Quebec, Sainte Anne des Monts, Parke Reserve in Kamouraska Co. at 950 ft., Ste. Marie, and Wakefield); Tennessee (Great Smoky Mountains National Park); West Virginia (Rockport); Wisconsin (Boscobel and Madison); Austria; Czechoslovakia; Germany; Ireland; Italy; Netherlands; and Switzerland.

Dates of collections are from mid-spring to mid-summer, with a few records in August. A long series collected in a Malaise trap at Ann Arbor, in 1959, shows the seasonal distribution very well. The first two catches were on May 6 and 10, after which there were almost daily catches lasting to July 29. The peak catches extended roughly from May 12 to July 16. There was only one catch after July 29, this on August 6. Outside of this series, the earliest seasonal record is April 29 at Spring Brook, Pa. All the catches after July are as follows: August 1 and 17 at Ithaca, N.Y.; August 2 in Gratiot Co., Mich.; August 3 and 6 at Ann Arbor, Mich.; August 17 at Ste. Marie, Que.; August 18 in Lincoln Co., Maine; and August 26 in Parke Reserve, Kamouraska Co., Que.

P. director is now very common in the northeastern quarter of the United States and southeastern Canada. The normal habitat is grassy meadows with interspersed trees and bushes. Since the species has only recently been collected in North America but has been known in Europe for about a hundred and fifty years, it has obviously been introduced into our area. The earliest North American specimens were collected in 1938. Within four years from then it had been found throughout most of its present range. During the 1938–1942 period it was collected in the following localities, listed by year:

1938. Quebec, Que.; and Swansea, near Toronto, Ont.
1939. Ile d'Orleans, Que.; Laurentides Park, Que.; Stittsville, Ont.; Medina, N.Y.; and Ithaca, N.Y.
1940. Pokemouche, N. B.; Quebec, Que.; Marmora, Ont.; Mackinac Island, Mich.; and Sharon Township, Washtenaw Co., Mich.
1941. East Point, P. E. I.; Lincoln Co., Maine; Greenwich, Vt.; Petersham, Mass.; Ottawa, Ont; East Lansing, Mich.; and Clawson, Mich.
1942. Midland Co., Mich.; and Takoma Park, Md.

During the period of 1934 to 1940, we and Mr. R. R. Dreisbach were actively collecting every season in New York and in Michigan, and sometimes in New Jersey, Rhode Island, Pennsylvania, and South Carolina. There were also other collectors picking up ichneumon flies within the present North American range. If the species had anything like the distribution and abundance then that it does now we would have found it prior to 1938. It must suddenly have become abundant and widespread about 1938, and soon afterward invaded most of the rest of the suitable habitat.

This species occurs in Europe and in the Transition and Upper Austral zones of eastern North America.

7. Genus Ischnus

FIGURE 311,b

Ischnus Gravenhorst, 1829, Ichneumonologia europaea, vol. 1, p. 638. Type: (*Ichneumon porrectorius* Fabricius) = *inquisitorius* (Müller); designated by Westwood, 1840.

Habrocryptus Thomson, 1873, Opuscula entomologica, fasc 5, p. 498. Type: (*Ichneumon porrectorius* Fabricius) = *inquisitorius* (Müller); designated by Viereck, 1914.

Aglaocryptus Cameron, 1903, Mem. Proc. Manchester Lit. Philos. Soc., vol. 47, part 14, p. 31. Type: *Aglaocryptus curvimaculatus* Cameron; designated by Viereck, 1914.

Erythrocryptus Cameron, 1905, Invert. Pacifica, vol. 1, p. 126. Type. (*Erythrocryptus rufus* Cameron) = *inquisitorius atriceps* (Cresson); monobasic.

Front wing 3.3 to 10 mm. long; body moderately slender; frons unarmed; clypeus rather small and strongly convex, often pryamidal in profile, its apical margin convex, sometimes with a median angulation; flagellum of male nearly always with a median white band; mesoscutum rather strongly arched, usually mat and with fine punctures but more or less polished and impunctate in some Indo-Australian species; notaulus moderately sharp, reaching to a little beyond center of mesoscutum; epomia rather weak; prepectal carina reaching or almost reaching the subtegular ridge; propodeum of moderate proportions, the basal carina complete, the apical carina complete, interrupted medially, or sometimes absent, sometimes forming a weak sublateral crest; propodeal spiracle circular or subcircular; areolet pentagonal, its sides strongly convergent; ramellus very short or absent; nervulus opposite basal vein; mediella strongly arched; axillus close to anal margin; first abdominal segment slender, moderately widened apically, its spiracle far behind the middle, with a lateral subbasal triangular point (weak in males, stronger in females); dorsal and dorsolateral longitudinal carinae of first tergite rather weak, the dorsal pair, if present, usually extending to a little behind spiracle, the dorsolateral carina usually complete but weak; ventrolateral longitudinal carina of first tergite complete; second tergite mat, with moderately small punctures that vary in density from sparse to close; tergite 7 without a median white spot but sometimes its apical margin white or yellow; ovipositor sheath about 0.30 as long as front wing; ovipositor rather slender, compressed, its tip sagittate.

Ischnus is almost world-wide in distribution, but the species are numerous only in the mountainous parts of the Oriental region. In the Nearctic region we have eleven species. Several of these are widely distributed and quite variable in both color and structure.

The species are parasitic on lepidopterous pupae. A number of reared specimens of several species are at hand, with their cocoons. The cocoons are elongate elliptic, rather thin, with loose silk on the outside, and white to light brown in color. They are spun partly or entirely inside the host pupal shell, or alongside it.

Key to the Nearctic species of Ischnus

1. Apical transverse carina of propodeum distinct and sharp medially . . 2
   Apical transverse carina of propodeum lacking or very indistinct medially, sometimes the entire carina lacking 5
2. Basal 0.2± of hind basitarsus fuscous or ferruginous; punctures on second tergite of female separated by about 3.0 their diameter; hind tibia not white basally . . . . 4. **sparsus,** new species

Basal 0.2± of hind basitarsus white; punctures on second tergite of female separated by about 0.2 to 0.8 their diameter; hind tibia white basally or subbasally except in *I. laurae* 3

3. Basal 0.2± of hind tibia light brown, or sometimes with a small whitish area; head black, the clypeus and entire scape fulvous; apical carina of propodeum distinct medially, indistinct submedially, and distinct again sublaterally. **3. laurae,** new species

Basal 0.2± of hind tibia mostly or entirely white; head, clypeus, and scape variously colored, almost never with the exact combination described for *I. laurae*; apical carina of propodeum distinct throughout 4

4. Head and thorax entirely black except that sometimes the subtegular ridge has a small white mark; tyloids thin and sharp, extending 0.90± the length of several segments and parallel to the long axes of the segments. **1. latus** (Provancher)

Head and thorax usually partly pale, especially with some whitish or brownish on clypeus, hind corner of pronotum, or scutellum; tyloids rather blunt, on several segments extending 0.75± the length of the segment, a little oblique to the long axis of the segments. (Some specimens colored just as in *latus pinguis* but distinguishable on the tyloids and minor structural differences as discussed under *latus*.) . . . . **2. cinctipes** (Walsh)

5. Frons polished, smooth, with very fine sparse punctures; apical carina of propodeum lacking . . . . **7. laevifrons,** new species

Frons mat, rugulose medially; apical carina of propodeum often present sublaterally 6

6. Scutellum with lateral carinae on its basal 0.3± in male, on its basal 0.4± in female 7

Scutellum without lateral carinae except on its basal corners 8

7. Punctures on scutellum of male separated by about 0.7 their diameter, on scutellum of female separated by about 0.5 their diameter; punctures on lateral lobe of mesoscutum separated by about 0.5 their diameter; the part of female first tergite behind the spiracle about 0.75 as long as wide; metapleurum of male usually less than half white . . **5. inquisitorius** (Müller)

Punctures on scutellum of male separated by about 0.3 their diameter, on scutellum of female the punctures almost touching; punctures on lateral lobe of mesoscutum very dense, subadjacent; the part of female first tergite behind the spiracle about 0.90 as long as wide; metapleurum of male almost entirely white; propodeum of male with a pair of white spots basad of the basal carina . . . . **6. velutinus,** new species

8. Hind coxa mostly or entirely fulvous or ferruginous 9

Hind coxa mostly or entirely black or fuscous 10

9. Mesoscutum mat, with fine punctures that are separated by about 1.8 their diameter; hind tibia with a basal or subbasal pale brown or stramineous band . . . . **8. rhomboidalis** (Walsh)

Mesoscutum polished, with small punctures that are separated by about 1.0 their diameter; hind tibia without a basal or subbasal pale band. **11. lautus,** new species

10. Mesopleurum with dense, fine wrinkling, its punctures indistinct. **9. minor,** new species

Mesopleurum rather smooth, polished, and with fine punctures and often also a little weak, fine wrinkling . . . . **10. politus,** new species

1. Ischnus latus (Provancher)

Front wing of male 3.8 to 6.1 mm. long, of female 3.6 to 6.5 mm. long; body a little stouter than in *I. cinctipes;* clypeus narrow; tyloids on about 4.5 segments, extending about 0.90 or practically the full length of the segments, narrow and sharp, parallel to the long axes of the segments; mesoscutum mat, its lateral lobes subpolished, its punctures rather small, weak, separated by about 1.2 their diameter; scutellum carinate only at its basolateral corners; metapleurum shining, with rather close, moderately large but weak punctures that are somewhat obscured by and confluent with weak, fine wrinkling; apical carina of propodeum complete, sharp and strong, its median 0.25 bowed forward; postpetiole weakly mat, with sparse or very sparse weak punctures; punctures on second tergite medium sized, separated by about 0.7 their diameter.

Black. Palpi stramineous to fuscous, the second segment of maxillary palpus white; scape of female often brown in front; flagellum with a white band that occupies usually 4 or 5 segments, the band usually incomplete below in the female; basal segments of female flagellum usually brownish; tegula usually white, but sometimes brown; subtegular ridge often with a small white mark; coxae and trochanters whitish, fulvous, or blackish, according to the subspecies; femora ferruginous, the front and middle femora sometimes infuscate basally behind and sometimes whitish at apex, the apical 0.18± of hind femur fuscous; front and middle tibiae fulvous to brownish ferruginous, often whitish at base; hind tibia brown to blackish, its basal or subbasal 0.2± white; basal 0.2 or more of hind basitarsus white, the apical 0.8 or less fuscous; second segment of hind tarsus white, its apex often brown or fuscous, or sometimes all but a narrow basal ring fuscous; third and fourth segments of hind tarsus white to brown or fuscous; fifth segment of hind tarsus fuscous; middle tarsus with a pale repetition of the hind tarsal color pattern or the dark markings more extensive; front tarsus brownish; abdomen ferruginous, the base of its first segment, fifth and following tergites, and usually part or all of fourth tergite black. Sometimes, in the subspecies *latus,* the femora and first abdominal segment are more extensively infuscate than described above.

This species is close to the European *Ischnus alternator* (Gravenhorst), 1829. In color the subspecies *latus* is particularly similar. The European species differs structurally in the more strongly mat and less punctate mesoscutum, more wrinkled and less punctate mesopleurum and metapleurum, finer and sparser punctures on second tergite, and slightly different course of the apical carina of propodeum, which in *latus* tends to turn forward a little more sublaterally at the position of the propodeal crests.

Ischnus latus is even closer to the Nearctic *I. cinctipes*, and is conceivably only subspecifically distinct. Besides the color differences, which are not impressive, it differs in a slightly more robust body, longer male tyloids which are parallel to long axes of their segments, more shiny lateral lobe of mesoscutum, stronger and more punctate sculpture of mesopleurum and metapleurum, weaker forward bowing of median part of apical carina of propodeum, and slightly smaller punctures on second tergite. These structural differences, however, are only average, all of them bridged by individual variation in both species. The difference in form of the male tyloids seems to be more constant, and in determining specimens has been used as a deciding character in doubtful cases.

There are two subspecies, as keyed and described below. We have seen no real intergrades.

1. Hind coxa black or blackish; range: Atlantic to Rocky Mountains in Canadian zone . . . . **1a. latus latus** (Provancher)
   Hind coxa fulvous or ferruginous; range: Atlantic to Minnesota, in Transition zone . . . . **1b. latus pinguis** (Provancher)

1a. Ischnus latus latus (Provancher)

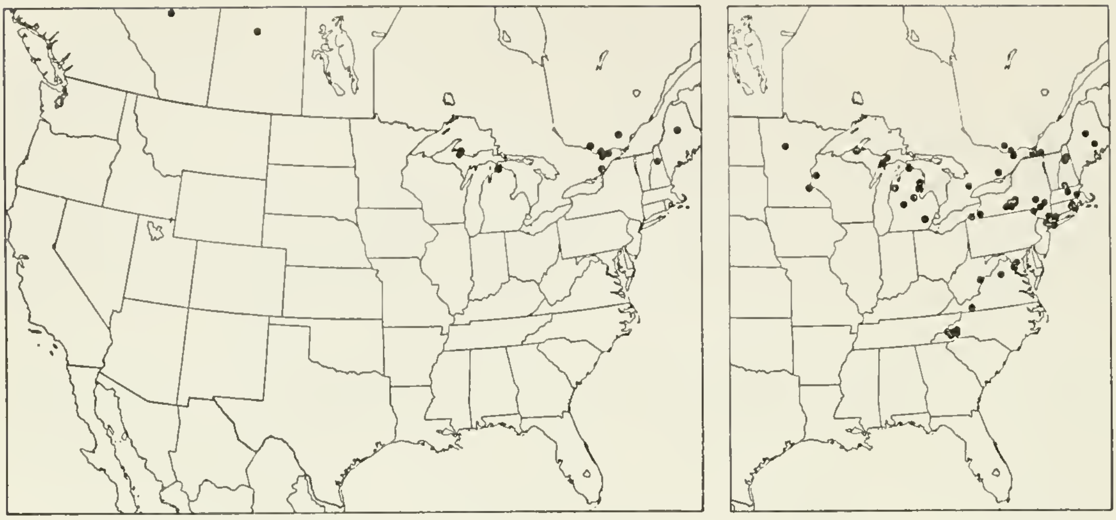
Cryptus latus Provancher, 1874, Naturaliste Canadien, vol. 6, pp. 178, 204; ♀ Type: ♀, Quebec (lost)

Phygadeuon 3-annulatus Provancher, 1882, Naturaliste Canadien, vol. 13, p. 335, 355 (Faune, p. 777); ♀. Name preoccupied by Gravenhorst, 1829. Type: ♀, Quebec (Quebec). New Synonymy

Cryptus 3-annulatus Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 74; ♂. Type: ♂, Ottawa, Ont. (Ottawa).

Ischnus fraterculus tricircularis Walkley, 1958, U.S. Dep. Agr., Agr. Monog., No. 2, suppl., p. 46. New name for *Phygadeuon 3-annulatus* Provancher.

Coxae black or blackish; first trochanters of front and middle legs brown or fuscous, their apices and sometimes the front side (usually in males), white; second trochanters of front and middle legs white in males, white, fulvous, or brown in females; first trochanter of hind leg brown or fuscous; second trochanter of hind leg fulvous to brown, in male sometimes partly white.



Figures 59, 60.—Localities: 59 (left), *Ischnus latus latus;* 60 (right), *I. l. pinguis.*

Specimens: 2♀, Edmonton, Alta., Aug. 27 and Sept. 1, 1945, E. H. Strickland (Edmonton and Townes). ♀, Slave Lake, Alta., Aug. 14, 1924, O. Bryant (Washington). ♀, summit of Mount Katahdin, 5,215 ft., Maine, Aug. 19, 1902 (Washington). ♀, Mount Katahdin, Maine, August 1902 (Washington). ♂, Douglas Lake, Mich., July, C. H. Kennedy (Townes). ♀, Huron Mts., Mich., July 19, 1959, H. Townes (Townes). ♂, Yellow Dog Plains, Marquette Co., Mich., July 28, 1959, H. Townes (Townes). ♂, Franconia, N.H., A. T. Slosson (New York). ♂, White Point Beach, Queens Co., N. S., Aug. 27, 1936, J. McDunnough (Ottawa). ♀, Blackburn, Ont., May 22, 1953, G. E. Ball (Ottawa). ♀, Gananoque, Ont., July 8, 1941, G. S. Walley (Ottawa). ♀, Aylmer, Que., Sept. 7, 1924, C. H. Curran (Ottawa). ♂, Aylmer, Que., Aug. 28, 1924, A. R. Graham (Ottawa). 2♀, Cascapedia, Que., June 22 and July 14, 1933, W. J. Brown (Ottawa). ♀, Norway Bay, Que., July 13, 1937, F. A. Urquhart (Ottawa). ♀, Queens's Park, Aylmer, Que., Aug. 20, 1924, G. B. Hutchings (Ottawa). 2♂, Sainte-Agathe-des-Monts, Que., Aug. 4 and 7, 1937, G. S. Walley (Ottawa). ♂, Prince Albert National Park, Sask., July 19, 1941, J. G. Rempel (Townes).

This subspecies ranges from Maine to Alberta in the Canadian zone. Most dates of collection are in July and August.

1b. Ischnus latus pinguis (Provancher), new status

Phaeogenes pinguis Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 43; ♀. Type: ♀, Ottawa, Ont. (Ottawa).

Front coxa ferruginous and fuscoferruginous to fuscous; middle coxa ferruginous, sometimes its apex infuscate; hind coxa ferruginous, rarely its apex infuscate; trochanters as described for the subspecies *latus* but paler, usually with a ferruginous or fulvous and white pattern but often the first trochanters largely infuscate or brown.

Specimens (41♂, 57♀): From Connecticut (Green Falls, Voluntown, and Westport); Kansas; Maine (summit of Mount Katahdin at 5,215 ft., and Orono); Maryland (Takoma Park); Massachusetts (Holliston and Princeton); Michigan (Alcona Co., Ann Arbor, Delta Co., Douglas Lake, Houghton Co., Manistee Co., Midland Co., Montcalm Co., Ogemaw Co., and Schoolcraft Co.); Minnesota (Hastings and Itasca State Park); New Hampshire (Jaffrey, Lakes of the Clouds on Mount Washington, and summit of Mount Washington at 6,100 to 6,288 ft.); New Jersey (Ramsey); New York (Bemus Point, Connecticut Hill near Trumbull Corner at 2,095 ft. in Tompkins Co., Farmingdale, Greene Co., Hancock, McLean Reservation, Millwood, Oliverea in the Catskills, Oneonta, Ringwood near Dryden, Six Mile Creek near Ithaca, and Taughannock near Ithaca); North Carolina (Clingmans Dome at 6,600 ft., Crabtree Meadows in Yancey Co. at 3,600 ft., Crestmont in Haywood Co. at 5,100 ft., Hamrick, and Mount Mitchell at 5,200 ft.); Ontario (Georgetown, Ottawa, and Tweed); Pennsylvania (North East); Quebec (Alcove, Aylmer, Brome, Hemmingford, and Knowlton); Rhode Island (Westerly); Virginia (Falls Church, Galax, and base of Stony Man on Skyline Drive in Shenandoah National Park at 3,500 ft.); West Virginia (Cheat Mt. at 2,000 ft. in Randolph Co.); and Wisconsin (Polk Co.).

Most collection dates are from June to September 7. Those outside this range are: May 6 at Ann Arbor, Mich.; May 9 at Takoma Park, Md.; May 18 at Jaffrey, N.H.; May 24 at Hemmingford, Que.; May 25 at McLean, N.Y.; May 26 at Falls Church, Va.; May 30 in Newaygo Co., Mich.; September 21 at Aylmer, Que.; September 29 in New York State; and September 24 and October 2 and 27 at Ringwood, near Ithaca, N.Y.

This subspecies occurs in the Alleghanian fauna.

2. Ischnus cinctipes (Walsh)

Cryptus cinctipes Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 72; ♂, ♀. Types: ♂, ♀, Illinois? (destroyed in Chicago fire of 1871).

Phygadeuon fraterculus Provancher, 1886, Additions et corrections au volume II de la fauna entomologique du Canada traitant des hyménoptères, p. 55; ♀. New synonymy. Type: ♀, Ottawa, Ont. (Ottawa).

Spilocryptus polychrosidis Cushman, 1917, Proc. U.S. Nat. Mus., vol. 53, p. 461; ♂, ♀. Type: ♀, North East, Pa. (Washington).

Front wing of male 3.4 to 6.8 mm. long, of female 3.2 to 6.0 mm. long; body moderately slender; clypeus narrow; tyloids on about 5 or 6 segments, extending about 0.75 the length of each of the segments, rather blunt, set slightly oblique to the long axis of the segments; mesoscutum mat, the median lobe a little more strongly mat than the lateral lobes, its punctures small, weak, separated by about 1.3 their diameter; scutellum carinate only at its basolateral corners; metapleurum somewhat mat or subpolished, with weak, more or less distinct punctures and irregular fine wrinkling; apical carina of propodeum complete, sharp and strong, its median 0.25± bowed strongly forward; postpetiole weakly mat, with moderately large, weak punctures that are separated by about 1.5 their diameter, or are sparser; punctures on second tergite rather large, moderately strong, separated by about 0.7 their diameter.

Coloration variable. The darkest specimens colored almost as in *I. pinguis pinguis* but with some brown or whitish usually on the clypeus, hind corner of pronotum, subtegular ridge, and scutellum, and a tendency for apical 0.3± of hind coxa to be weakly infuscate. The palest specimens are mostly fulvous with extensive white markings. The head varies from entirely black with the clypeus brownish, to mostly white with the median part of the frons and most of the occiput blackish. The antenna is black with the scape white or fulvous in front and a broad white band on the flagellum. The basal segments of the female flagellum are often brownish. The thorax varies from black with the hind corner of the pronotum and scutellum more or less whitish or brown, to fulvous with the pronotum, prosternum, mesosternum, scutella, most of mesopleurum, and narrow markings on mesoscutum whitish and the margin and hind part of mesoscutum, areas next to scutella, and mesopleurum below the subtegular ridge fuscous. The tegula is always white. The front and middle legs vary from dark fulvous with the trochanters whitish and the tibiae and tarsi somewhat darkened, to stramineous with the coxae and trochanters whitish. Usually there is a faint repetition of the banding of the tibia and tarsus of the hind leg on those of the middle leg, and sometimes also on the front leg. The hind coxa is fulvous, sometimes a little darkened apically; hind trochanters fulvous or more or less whitish; hind femur fulvous, its apical 0.18± infuscate; hind tibia fulvous to brown, its basal or subbasal 0.18± white; hind basitarsus entirely white, or apically fuscous with its basal 0.18 or more white; second segment of hind tarsus white to light brown, usually white with more or less of the apex fuscous; third and fourth segments of hind tarsus usually entirely white, sometimes brownish apically; fifth segment of hind tarsus brown or black. The abdomen is usually fulvous, often with its apex fuscous. Sometimes it is more extensively fuscous and rarely entirely fuscous except for paler apical margins of the median tergites.

Specimens from the northern part of the range and smaller specimens both tend to have darker coloration than those from the southern part of the range and larger specimens. There is considerable regional segregation of the various color patterns exhibited by the species, but variation in degree of development or standardization of the patterns, and wide overlaps in their distribution make it impractical to set up subspecies on color characters.

Specimens (402♂, 306♀): From Alabama (Coleta in Clay Co., Langdale, and Pyriton in Clay Co.); Connecticut (Green Falls, Ledyard, New Haven, North Stonington, Stonington, and Voluntown); District of Columbia (Georgetown and Washington); Florida (Oneco); Georgia (Blood Mt., Clayton at 2,000 ft., Macon, and Pine Mountain in Rabun Co. at 1,400 ft.); southern Illinois; Indiana (Forest Nursery in Daviess Co.); Iowa (Ames); Kansas (Lawrence and Montgomery Co. at 798 ft.); Kentucky (Crailhope and 20 miles southwest of Louisville); Maryland (Baltimore, Bowie, Cabin John, Chevy Chase Lake, College Park, Glen Echo, Great Falls, Hyattsville, Patuxent Reserve near Bowie, Plummers Island, and Takoma Park); Massachusetts (Gloucester, Holliston, and Weston); Michigan (Ann Arbor, George Reserve in Livingston Co., Gladwin Co., Gratiot Co., Huron Co., Huron Mts., Iron Co., Isabella Co., Jackson Co., Lawton, Midland Co., Missaukee Co., Montcalm Co., Muskegon Co., Ontonagon Co., Osceola Co., Presque Isle Co., Roscommon Co., and Wayne Co.); Minnesota (Hennepin Co. and Luverne); Missouri (Overland); New Hampshire (Auto Road on Mount Washington at 3,200 ft.); New Jersey (Moorestown, Riverton, and Westville); New York (Bemus Point, Canajoharie, Farmingdale, Greene Co., Ithaca, Juanita Island in Lake George, Lake Sebago in Bear Mountain Park, Poughkeepsie, Shokan, Six Mile Creek in Ithaca, Syracuse, and Whitesville); North Carolina (Balsam Gap at Balsam in Jackson Co., valley of Black Mts., Burnsville, Cedar Mountain, Clingmans Dome at 6,600 ft., Clinton, Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Elizabethtown, Garland, Hamrick, Highlands at 3,800 ft., Marshall, Mount Mitchell, Murfreesboro, North Fork of Swannanoa [River] in Black Mts., Mount Pisgah at 5,300 ft., and Raleigh); Ohio (Akron, Bedford, Cleveland, Columbus, Hinckley, Hocking Co., Miami Co., Montgomery Co., Puritas Springs in Cuyahoga Co., Put-in-Bay, and Ross Co.); Ontario (Dow's Swamp near Ottawa, Leamington, Merivale, and Ottawa); Pennsylvania (Cresheim Valley near Philadelphia, Crisp in Westmoreland Co., Enola, High Spire, Lehigh Gap, Leopard in Chester Co., "Lewiston," North East, Ohiopyle, Philadelphia, Pittsburgh, Presque Isle in Erie Co., Spring Brook, and Valley Forge); Quebec (Aylmer and St. Esprit); Rhode Island (Ashaway and Westerly); South Carolina (Columbia, Greenville, McClellanville, near Tigerville, and Wattacoo in Pickens Co.); Tennessee (Clarksville, Gatlinburg, and Lebanon); Texas (Kerrville and Plano); Virginia

(Arlington, Black Pond in Fairfax Co., Chain Bridge near McLean, Dead Run in Fairfax Co., Dyke, Falls Church, Galax, Glencarlyn, Great Falls, Passage Creek, Rosslyn, and Skyline Drive); West Virginia (Bolivar and Cheat Mt. at 2,000 ft. in Randolph Co.); and Wisconsin (Madison).

Dates of collection are from mid-spring to mid-fall, starting in early April in Florida and central Georgia; in late April along the fall line of the South Atlantic States; early May in the vicinity of Washington, D.C.; mid-May near Philadelphia, Pa.; and late May near Ithaca, N.Y. Disappearance in the fall is with the beginning of frost, in the vicinity of Washington, D.C., around October 10 to 18. Unusually late records are October 10 at Gloucester, Mass., and November 15 at Takoma Park, Md.

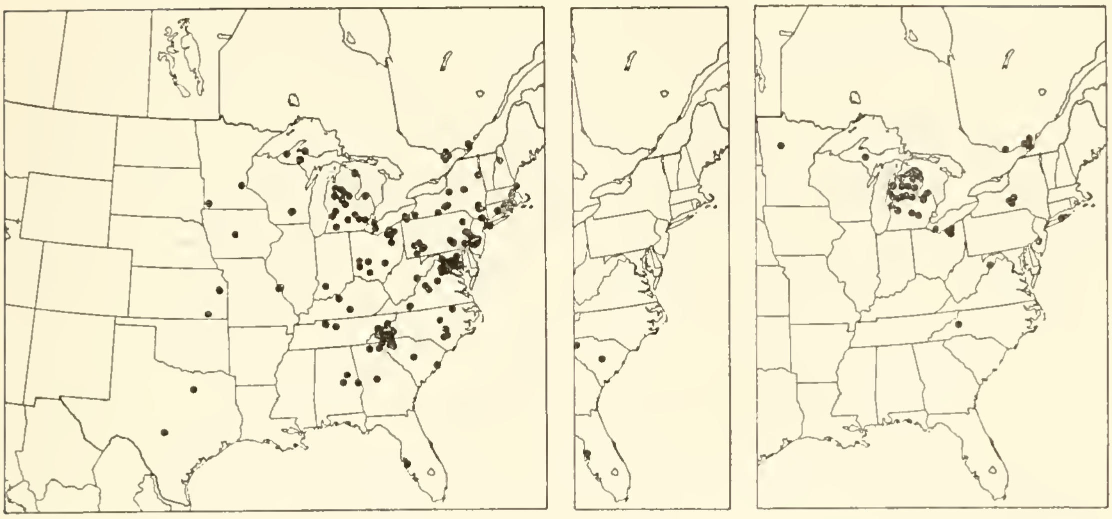
Reared specimens include six lots from *Polychrosis viteana* at scattered localities and the following individual host records: ♀, from *Ancylis divisana,* College Park, Md., Aug. 9, 1934. ♂, from *Ancylis comptana,* Ames, Iowa, E. W. Dunnam. ♂, from *Ancylis comptana,* Washington, D.C., Aug. 5, 1910, Chittenden. We find the species in the undergrowth of mesophytic or damp deciduous woods, usually flying among or alighting on foliage at 1 to 2 meters height. It is often very common.

This species occurs in the Alleghanian, Carolinian, and Austroriparian faunas.

3. Ischnus laurae, new species

Front wing of male 4.0 to 4.1 mm. long, of female 4.0 mm. long; differs structurally from *I. cinctipes* in having the tyloids on only 2 or 3 segments and sharp, in line with long axis of the segments, and extending about 0.8 the length of the segments; mesoscutum less distinctly punctate; mesopleurum and metapleurum a little more sharply wrinkled; apical carina of propodeum a little weaker (indistinct submedially); and punctures on second tergite averaging a little larger and closer.

Black. Clypeus, mouth parts, scape, and pedicel fulvous, the pedicel infuscate above; base of female flagellum dusky fulvous; flagellum of both sexes with a white band, the band of female brown below; propleurum of male black, of female mostly fulvous; pronotum of male white along its front and lower edges, on hind corner, and sometimes along upper edge; pronotum of female white anteriorly, along upper edge, and broadly along lower edge; tegula, subtegular ridge, scutellum, postscutellum, and small spot on mesopleurum next to middle coxa, white or whitish; front and middle legs fulvous, their tarsi brownish apically, their coxae and trochanters stramineous; hind coxa, trochanters, and femur fulvous, the apical 0.15 of the femur weakly infuscate; hind tibia dusky fulvous, more strongly infuscate



Figures 61–63.—Localities: 61 (left), *Ischnus cinctipes;* 62 (center), *I. laurae;* 63 (right), *I. sparsus.*

apically, sometimes its basal 0.15± paler or with a whitish mark, but without a distinct white band; abdomen fulvous, its apex a little darkened; hind tarsus fuscous, the basal 0.25 of its first segment, all of second segment, and part or all of third segment, white.

This species is named for Laura Townes, the collector of some of the specimens used in this and other studies.

Type: ♂, Greenville, S.C., Apr. 20, 1952, George and Laura Townes (Washington, USNM 63764).

Paratypes: ♂, Tarpon Springs, Fla., Mar. 21, 1950, H. Townes (Townes). ♀, Columbia, S.C., Sept. 10, 1950, G. Townes (Townes).

4. Ischnus sparsus, new species

Front wing of male 5.1 to 6.8 mm. long, of female 5.5 to 7.4 mm. long; body moderately slender; clypeus narrow; tyloids on about 4 segments, moderately sharp, extending about 0.7 the length of the segments; mesoscutum mat, with small, weak punctures that are separated by about their diameter; scutellum with lateral carinae on its basal 0.3±; metapleurum of male subpolished, rather smooth but with weak irregular punctures and fine indistinct wrinkling; metapleurum of female rugulose because of close, irregular weak punctures and wrinkling; apical carina of propodeum complete, sharp, roughly in the shape of an inverted V; postpetiole weakly mat, in male with moderately large, weak, rather close punctures, in female with very sparse, fine, weak punctures; second tergite of male weakly mat, with rather large, shallow punctures that are separated by about 0.5 their diameter; second tergite of female mat, with sparse, shallow punctures that are separated by about 3.0 their diameter.

Male: Head ivory, the median half of frons and occiput except near eyes, black; mouth parts ivory; scape and pedicel whitish, fuscous above; flagellum black, with a white band; propleurum ivory except for fuscous basolateral mark; pronotum ivory except in scrobe; mesonotum black, a median spot on mesoscutum and the scutellum ivory; postscutellum and tegula ivory; mesosternum and mesopleurum ivory except that part of prepectus and a mark beginning just below subtegular ridge and curving below speculum are fuscous; metapleurum ivory, anteriorly fulvous, fuscous near its front edge; upper division of metapleurum ivory; propodeum black basad of basal carina, mostly fulvous between basal and apical carinae, and ivory near and apicad of apical carina; front and middle coxae and trochanters ivory; front and middle legs beyond trochanters pale fulvous, their tarsi infuscate apically; hind coxa fulvous, with a longitudinal fuscous stripe above and with a posterior dorsoapical whitish area; first hind trochanter fuscous, fulvous apically; second hind trochanter and hind femur fulvous; hind tibia fulvous, its apical 0.3± infuscate; hind tarsus white, the basal 0.2± of its first segment and apical 0.7± of its last segment fuscous; abdomen fulvous, the subbasal 0.5± of first tergite, basal 0.3± of second tergite, and often basal 0.1± of third tergite more or less infuscate.

Female: Head varying from mostly ivory with median part of frons and occiput except eyes black, to entirely black except for whitish orbital marks on face, occiput, and temple; mandible usually ferruginous and fuscous, sometimes partly whitish; palpi white; scape and pedicel fulvous or light brown, fuscous above; flagellum black, with a broad white band; propleurum black; pronotum black or more or less fulvous, more or less of its upper margin and usually some or all of its lower margin whitish; mesonotum and metanotum ferruginous, with black sutural markings and the postscutellum and apex of scutellum usually whitish; tegula pale fulvous to brown; subtegular ridge yellow or fulvous; rest of thorax ferruginous except often for some restricted fuscous areas; coxae ferruginous, much or all of front coxa and dorsoapical area on middle and hind coxae usually infuscate; trochanters ferruginous, the first trochanter often infuscate basally and the second trochanter of front and middle legs partly yellowish; femora and tibiae ferruginous, the apical 0.2± of hind tibia usually somewhat infuscate; front and middle tarsi ferruginous; hind tarsus pale yellowish, the basal 0.4± of its first segment, all of fourth and fifth segments, and none to all of third segment ferruginous; abdomen ferruginous.

Type: ♀, Midland Co., Mich., Aug. 11, 1940, R. R. Dreisbach (Washington, USNM 63765).

Paratypes (31♂, 31♀): From Michigan (Alcona Co., Alpena Co., Alto, Ann Arbor, Antrim Co., Cheboygan Co., Clare Co., Dickinson Co., East Lansing, Gladwin Co., Huron Co., Isabella Co., Lake Co., Manistee Co., Mecosta Co., Midland Co., Montmorency Co., Muskegon Co., Newaygo Co., Oceana Co., Osceola Co., Otsego Co., Presque Isle Co., and Tuscola Co.); Minnesota (Itasca Park); New Jersey (Moorestown); New York (Eastport, Ithaca, southeast slope of McLean Bogs Reserve, and Six Mile Creek near Ithaca); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft.); Ohio (Cleveland, Hinckley, Puritas Springs in Cuyahoga Co., and Put-in-Bay); Quebec (Aylmer, Joliette, La Trappe, and St. Esprit); West Virginia (Lost River State Park in Hardy Co.); and Wisconsin.

Dates of collections are from mid-spring to late summer, the dates prior to June and later than August being as follows: May 7 in Alto Co., Mich.; May 8 and 16 in Mecosta Co., Mich.; May 20 in Lake Co., Mich.; May 26 in Osceola Co., Mich., and at Puritas Springs, Ohio; September 3 in Montmorency Co., Mich.; September 4 in Clare Co., Mich.; and September 16 in McLean Bogs Reserve, Tompkins Co., N.Y.

This species occurs in the Alleghanian fauna.

5. Ischnus inquisitorius (Müller)

Front wing of male 4.0 to 7.5 mm. long, of female 5.0 to 8.5 mm. long; body moderately slender; clypeus narrow, in profile somewhat pyramidal; tyloids on 3 or 4 segments, narrow, extending about 0.65 the length of the segments; mesoscutum mat, with fine punctures that are separated by about 0.5 their diameter; scutellum with lateral carinae on its basal 0.3± in male, on its basal 0.4± in female; punctures on scutellum separated by about 0.7 their diameter in male, by about 0.5 their diameter in female; metapleurum with small dense punctures that are more or less confluent with rather fine wrinkling; apical carina of propodeum completely absent on its median 0.35±, sublaterally strong and sharp; postpetiole weakly mat or subpolished, with small, rather weak punctures that are irregular and sparse in male, very sparse in female, the portion of female postpetiole behind the spiracle about 0.75 as long as wide; second tergite weakly mat, with rather fine, usually weak punctures that are separated by about 0.3 to 0.7 their diameter.

This species is Holarctic. The coloration, size, and sculpture are variable if the whole range is considered, but in a single region they are moderately constant. We divide the available specimens into six subspecies. These are defined rather arbitrarily and on relatively variable characters. Also, there are broad zones of intergradation. The proposed segregates, however, are useful in describing and understanding the variations and their geographic distribution. Below are keys to and descriptions of the forms that we consider subspecies. Doubtless there are more subspecies in Eurasia, some of which may already be described (as species).

In both hemispheres are some closely related forms southward of the stated range of *inquisitorius*, that may prove to be additional subspecies when material from intervening localities is available. One of these is the form of northern Japan and the Kurile Islands, which Uchida in 1936 described as *Habrocryptus assimilis* form *yezoensis*. In *yezoensis*, the punctures on the mesoscutum are stronger and denser, flagellar segments of male shorter, and cheek shorter than in *inquisitorius*. There may be intergrading populations in Kamchatka or the northern Kuriles, so this too may be a subspecies. For the present we believe it to be a distinct species, which should be called *Ischnus yezoensis* (Uchida), new status, new combination. A second case is *I. velutinus* of Arizona. On the basis of available specimens it seems to be a distinct species, but additional specimens may show it to be a subspecies of *inquisitorius*.

MALES

(The male of the subspecies *assimilis* is unknown.)

1. Range: Eurasia and Alaska; hind coxa entirely black or sometimes marked with white 2
   Range: North America; hind coxa usually more or less ferruginous but sometimes entirely black or black and white. 3
2. Hind femur largely or entirely ferruginous; front coxa black and yellow; range: northern and central Europe. . **5a. inquisitorius inquisitorius** (Müller)
   Hind femur black, its base more or less ferruginous; front coxa black; range: central Europe . . . . . . **5b. inquisitorius brachyurus** (Gravenhorst)
3. Mesoscutum mostly or entirely fulvous, often with the margin black and sometimes with a median yellow spot; range: British Columbia to California and Utah . . . . **5e. inquisitorius atriceps** (Cresson)
   Mesoscutum black, sometimes with a median yellow spot 4
4. Mesosternum entirely black, without a white mark next to sternaulus; range: Rocky Mountains from Colorado northwards, Yukon, Alaska, and eastward in Canadian zone to Ontario.
   5d. inquisitorius pectoralis, new subspecies
   Mesosternum partly white, at least with a white mark next to sternaulus; range: Atlantic Ocean to Rocky Mountains in Canadian and Transition zones . . . . **5f. inquisitorius atricollaris** (Walsh)

FEMALES

1. Propodeum and hind coxa entirely black; range: Eurasia and Alaska . . . 2
   Propodeum and hind coxa largely or entirely ferruginous or fulvous; range: North America 4
2. Scutellum with a white spot; fifth tergite ferruginous; second segment of hind tarsus pale yellow; range: northern and central Europe
   5a. inquisitorius inquisitorius (Müller)
   Scutellum entirely black; fifth tergite black 3

3. Second segment of hind tarsus light brown; fourth tergite ferruginous, its apical part often blackish; range: central Europe
5b. inquisitorius brachyurus (Gravenhorst)
Second segment of hind tarsus yellowish white; fourth tergite entirely black; range: Sachalin and part of Alaska . **5c. inquisitorius assimilis** (Uchida)
4. Pronotum fulvous, often with small yellowish markings; tegula fulvous; range: British Columbia to California and Utah.
5e. inquisitorius atriceps (Cresson)
Pronotum black, largely infuscate, or rarely mostly fulvous, usually with white markings; tegula white, fulvous, or brown 5
5. Mesopleurum entirely black or less than 20% ferruginous; upper margin of pronotum entirely black or partly white, not entirely white; fifth tergite black; range: Rocky Mountains in Colorado and northward, Yukon, Alaska, and eastward in Canadian zone to Ontario.
5d. inquisitorius pectoralis, new subspecies
Mesopleurum at least 20% ferruginous: upper margin of pronotum entirely white, or rarely the stripe subdivided into a white dash in front and another behind; fifth tergite usually ferruginous but sometimes blackish; range: Atlantic Ocean to Rocky Mountains in Canadian and Transition zones.
5f. inquisitorius atricollaris (Walsh)

5a. Ischnus inquisitorius inquisitorius (Müller)

Ichneumon inquisitorius O. F. Müller, 1776, Zoologiae Danicae prodromus . . . , p. 151; ♂. Described from Denmark and Norway. Type: ♂ (lost).
Ichneumon porrectorius Fabricius, 1787, Mantissa insectorum, p. 260; ♂. Type: ♂, Kiel, Germany (Kiel, on deposit in Copenhagen).

Sculpture somewhat smoother than in most Nearctic specimens, especially on the tergites. The second tergite is subpolished and with very shallow punctures.

The coloration is variable and complex, as in the other subspecies, but has the same basic features. The distinguishing subspecific characters are given in the keys. Refer to European literature for a color description.

The above synonymy lists only the two better known names. European authors list additional synonyms.

Specimens: 3♂, 5♀ from Sweden, Germany, and Austria.

5b. Ischnus inquisitorius brachyurus (Gravenhorst)

Cryptus brachyurus Gravenhorst, 1829, Opuscula ichneumonologica, vol. 2, p. 572; ♀. Types: ♀, "circa Warmbrunn, Norimbergam et Aboam" [Germany] (Wroclaw?). Type not seen.

There is some doubt whether this is a subspecies of *inquisitorius* or a distinct species. We have what seem to be intergrades. Besides in color, as stated in the keys, *brachyurus* differs from typical *inquisitorius* in having the punctures on the second tergite usually a little sharper and denser. See the European literature for more complete descriptions of the color.

Specimens: 22♂, 6♀ from Sweden, Germany, Austria, and northern Italy.

5c. Ischnus inquisitorius assimilis (Uchida), new status

Habrocryptus assimilis Uchida, 1930, Journ. Fac. Agr. Hokkaido Imp. Univ., vol. 25, p. 313; ♀. Type: ♀, Kiminai, Sachalin (Sapporo).

Male: Unknown.

Female: Postpetiole and second tergite a little less mat than in other Nearctic subspecies.

Black. Eye with a whitish orbital mark dorsally; palpi fuscous; scape, pedicel, and basal part of flagellum dark brown, the rest of flagellum black with a white band that covers 3.5 to 4 segments; tegula dark brown; second trochanters brown to ferruginous; femora fulvoferruginous, the apical 0.3± of hind femur faintly infuscate in specimen from Sachalin, moderately infuscate in specimen from Alaska; tibiae fulvoferruginous, the apex of hind femur faintly infuscate in specimen from Sachalin, distinctly infuscate in specimen from Alaska; front and middle tarsi fulvoferruginous, somewhat infuscate apically; hind tarsus brown, its second and third segments whitish, the third segment with a subapical brown area in the specimen from Alaska.

This subspecies is distinct from the subspecies *pectoralis* in that it has no ferruginous on the coxae or thorax (in the female, at least). Some specimens of *pectoralis* from Yukon and Alaska approach *assimilis* and may be considered intermediates. If there is any ferruginous on the coxae and thorax, the specimens have been classified as *pectoralis*, though some other distinction may later prove to be more natural or useful.

Specimens: ♀, in rotary trap, Matanuska, Alaska, June 20, 1944, J. C. Chamberlin (Townes). ♀, Karafuto, Sachalin, Siberia, C. Watanabe (Townes). This latter specimen was compared with Uchida's type.

5d. Ischnus inquisitorius pectoralis, new subspecies

Sculpture of pleura and propodeum averaging a little coarser and stronger, and punctures on second tergite averaging a little sharper and denser than in the subspecies *atricollaris*.

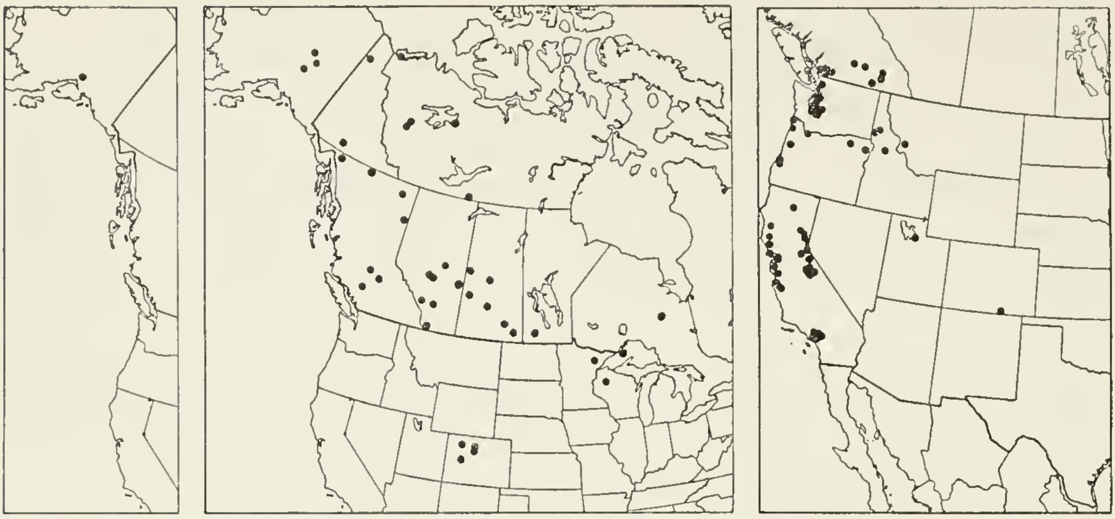
Typical male: Black. Cheek, front orbit, lower part of temporal orbit, vertical orbit, band on flagellum, tegula, dash on upper part of pronotum in front of tegula and another at upper end of epomia (rarely these are joined), usually collar, rarely lower edge of pronotum, subtegular ridge, spot on scutellum, postscutellum, spot on upper division of metapleurum, often an irregular subapical transverse band on propodeum, front and middle trochanters, and segments 2–4 of hind tarsus, white or ivory; palpi whitish, darkened apically; front and middle femora and tibiae fulvous; front and middle tarsi brown, paler at the joints; front and middle coxae brown or blackish, often with ferruginous stains; hind coxa usually fulvoferruginous with a broad fuscous stripe dorsally, often more extensively fuscous and sometimes entirely black; hind femur fulvoferruginous, its apical 0.25± infuscate; hind tibia brown, fuscous apically; first and fifth segments of hind tarsus fuscous; tergites 1–4 ferruginous, the basal 0.5± of the first infuscate. There are many intergrades toward the subspecies *atricollaris*. The arbitrary dividing line between the two forms is as stated in the key.

Typical female: Black. Vertical orbit, sometimes part or all of facial and frontal orbits, band on flagellum, sometimes a dash on pronotum at upper end of epomia, sometimes a spot on hind corner of pronotum, sometimes tegula, sometimes spot on scutellum, second segment of hind tarsus, and more or less of third segment of hind tarsus, white; palpi brown; tegula white, fulvous, or brown; metapleurum, upper division of metapleurum, and propodeum more or less ferruginous; front coxa fuscous or more or less ferruginous; middle coxa ferruginous or more or less infuscate; hind coxa ferruginous, usually infuscate dorsoapically; first trochanters fuscous or partly ferruginous; front and middle legs beyond trochanters ferruginous; hind femur and tibia ferruginous, their apical 0.2± fuscous; first, fourth, and fifth segments of hind tarsus, and sometimes part or all of third segment brown; first four tergites ferruginous, the rest black.

Type: ♀, Edmonton, Alta., June 30, 1945, E. H. Strickland (Washington, USNM 63766).

Paratypes (36♂, 46♀): From Alaska (Big Delta, Mile 315 on Richardson Highway, and Shaw Creek at Mile 289 on Richardson Highway); Alberta (Banff, Calgary, Consort, Edmonton, Lacombe, Sylvan Lake, and Waterton Lakes); British Columbia (Atlin at 2,200 ft., Canim Lake, Fort Nelson, Likely, Lower Post, Marble Canyon near Lillooet, and Taylor); Colorado (Fraser, Grand Lake, Pando, and Steamboat Springs); Manitoba (Aweme); Michigan (Isle Royale); Minnesota (Grand Rapids); New Mexico (Cloudcroft at 9,000 ft. and South Fork of Eagle Creek in White Mts. at about 8,000 ft.); Northwest Territories (Cameron Bay on Great Bear Lake, Canol near Norman Wells, Fort Smith, Norman Wells, and Reindeer Depot on Mackenzie Delta); Ontario (Smoky Falls on Mattagami River); Saskatchewan (Glaslyn, Kenosee Lake, Oakshela, Pierceland, Prince Albert National Park, and Saskatoon); Wisconsin (Sawyer Co.); and Yukon Territory (Rampart House and 8 miles southwest of Whitehorse at 1,000 ft.).

Collection dates of males are mostly from early July to mid-August. The earliest and latest dates are: June 5 eight miles southwest of Whitehorse, Yukon; June 28 at Shaw Creek, Mile 289 on Richardson Highway, Alaska; July 2 and 5 at Edmonton, Alta.; August 17 at



FIGURES 64–66.—Localities: 64 (left), *Ischnus inquisitorius assimilis;* 65 (center), *I. i. pectoralis;* 66 (right), *I. i. atriceps.*

Calgary, Alta.; August 18 on the South Fork of Eagle Creek, 8,000 ft., White Mountains, N. Mex.; and August 19 at Lower Post, B. C. Females have been collected mostly in June, July, and early August. Their earliest and latest dates are: May 5 at Saskatoon, Sask.; June 7 at Mile 315 on the Richardson Highway, Alaska; June 8 at Sylvan Lake, B.C.; June 8 and 12 at Fort Nelson, B.C.; August 6 at Steamboat Springs, Colo.; and August 9 and 24 at Grand Lake, Colo. There is some evidence here of a single generation per year with overwintering as an adult female. The record of a male on June 5 near Whitehorse, Yukon, however, implies that overwintering is sometimes also as males or in an immature state.

Reared specimens are as follows: ♀, from *Choristoneura conflictana,* Pierceland, Sask., July 17, 1951. ♀, from *Choristoneura conflictana,* Glaslyn, Sask., July 24, 1952. ♀, from *Choristoneura conflictana,* Oakshela, Sask., June 24, 1952. ♀, from "cocoon of aspen leaf," Fort Smith, N. W. T., July 9, 1950, J. B. Wallis. ♀, from cocoon tying terminal leaves of *Salix,* Fort Smith, N. W. T., July 14, 1950, J. B. Wallis.

This subspecies ranges through the Transition and Canadian zones of the Rocky Mountain area, and eastward in the Canadian zone as far as central Ontario.

5e. Ischnus inquisitorius atriceps (Cresson)

Cryptus atriceps Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 361; ♀. Type: ♀, Great Salt Lake, Utah (Philadelphia).

Erythrocryptus rufus Cameron, 1903, Invert. Pacifica, vol. 1, p. 126; ♀. Type: ♀, Claremont, Calif. (London).

Gambrus venablesi Viereck, 1924, Canadian Ent., vol. 56, p. 65; ♀. Type: ♀, Vernon, B. C. (Ottawa).

Sculpture of pleura and propodeum averaging a little coarser and stronger, and punctures on second tergite averaging a little sharper and denser than in the subspecies *atricollaris*.

Typical male: Head black, or sometimes fulvous, the orbits broadly (except upper part of temporal orbit), face (except usually for a pair of dusky spots just above base of clypeus), cheek, and clypeus, ivory or light yellow; mandible yellow basally, the rest fulvous, tipped with black; palpi ivory, darkened apically; scape and pedicel light fulvous, fuscous above; flagellum black, with a rather narrow ivory band, its base usually with a fulvous stripe; propleurum black, its lower half yellow; front, lower, and upper margins of pronotum yellow, the rest black or black and fulvous, the yellow on upper margin often divided into two yellow dashes; tegula, subtegular ridge, scutellum, postscutellum, usually part of upper division of metapleurum, often stripe below sternaulus and a spot above, often apical spot on metapleurum, and sometimes irregular transverse band on apical part of propodeum, yellow; sutural markings around wing bases fuscous; front and middle coxae yellow and fulvous, their trochanters yellow; front and middle legs beyond trochanters fulvous, their tarsi brownish apically; hind coxa fulvous, often with a yellow area above; hind first trochanter fulvous or brown; hind second trochanter yellowish; hind leg beyond the trochanters fulvous, the second to fourth tarsal segments light yellow; wings with a faintly fulvous tinge; abdomen fulvous.

Typical female: Head fulvous or sometimes black, the vertical and frontal orbit and clypeus more or less yellowish; mandible fulvous; palpi light fulvous brown; antenna fulvous brown, darker apically, with a white band that covers about 4 segments and is fulvous below; propleurum black, its lower half fulvous, the rest of thorax fulvous with some restricted sutural black marks and the front and lower edge of pronotum, more or less of upper edge of pronotum, mark on subtegular ridge, postscutellum, and apex of scutellum, yellowish; tegula fulvous; legs fulvous, the first trochanters usually brownish basally and the tarsi brownish apically, the second and third segments of hind tarsus more or less yellow; wings with a fulvous tinge; abdomen fulvous.

This subspecies is more sharply marked than the others, and though there are intergrading tendencies, we have seen only two specimens which cannot be placed easily. One is a female from Jenny Lake, Grand Tetons, Wyo., June 1941, G. E. Bohart (Davis), which is intermediate to the subspecies *atricollaris*. The other is the type specimen of *atriceps*, a female from Great Salt Lake, Utah. It has the tegula partly white and partly fulvous and the pronotum black with a broad fulvous mark along its upper and lower edges. It does not agree with the key characters of the present subspecies, but seems better placed here than elsewhere.

Specimens (30♂, 89♀): From British Columbia (Ainsworth, Cultus Lake, 4 miles north of Hope on Frasier River, Kaslo, Nanaimo Biological Station, Robson, Salmon Arm, Steelhead, and Vancouver); California (Arroyo Seco Camp in Monterey Co., Berkeley, Bixby Creek in Monterey Co., Camino, Carmel, Cazadero, Crane Flat in Yosemite Park, Crystal Lake in San Gabriel Mts., Dardanelle, Donner Pass, Echo Lake, Fish Camp, Fullerton, near Glacier Point in Yosemite Park, Glendale, Graeagle, Hopland, Los Angeles, Mill Valley, Moose Camp in Shasta Co., Palo Alto, Redlands, Ryan Creek in Mendocino Co., Santa Cruz Mts., Snow Flat in Yosemite Park at 8,700 ft., Tamarack Flat in Yosemite Park, Truckee, and Yosemite Valley); Colorado (Morley); Idaho (Cornwall, Moscow Mt., and Slate Creek Ranger Station in Idaho Co.); Montana ("Columbia Mt." and Montana Experiment Station at Como); Oregon (Cannon Beach, Coquille, Corvallis, Gresham, Marshfield, Meacham, Warrenton, and Whitman National Forest near North Powder); eastern South Dakota; and Washington (Ashford, Bothell, Elbe, Everett, "Middle Gallatin Canyon," Mount Rainier at 2,900 and 5,000 ft., Puyallup, South Bellingham, and Yelm).

Dates of collection for males are distributed from late spring to late summer, unusually early and late seasonal dates being: May 5 at Berkeley, Calif.; May 9 at Hopland, Calif.; May 26 at Fullerton, Calif.; June 27 at Marshfield, Oreg.; August 8 at Warrenton, Oreg.; August 20 at Bixby Creek, Monterey Co., Calif.; August 22 to 26 at Bothell, Wash.; and August 26 at Morley, Colo. Dates of collection for females are from early spring to early fall, unusually early and late seasonal dates being as follows: February 28 in Mill Valley, Calif.; March 30 at Berkeley, Calif.; April 12 to 14 at Cazadero, Calif.; April 24 at Robson, B. C.; September 8 at Ryan Creek, Mendocino Co., Calif.; October 3 at Salmon Arm, B. C.; November 25 at Glendale, Calif. The majority of collecting records for both sexes are in the summer months. Since females appear much earlier in the season than males and linger later, it is probable that overwintering is as adult females.

Reared specimens are as follows: ♀, from *Choristoneura fumiferana,* Whitman National Forest near North Powder, Oreg., Aug. 7, 1952, W. K. Coulter. ♀, from *Choristoneura rosaceana* 1911. ♀, from pupa of *Choristoneura rosaceana*, Gresham, Oreg., Aug. 6 to 19, 1944, J. S. and H. J. O. ♂, from *Archips argyrospilus*, Montana Experiment Station at Como, Mont. ♀, from orange tortrix on *Rhododendron* (*Azalea*) sp., Puyallup, Wash., material collected June 19, 1948, emergence June 25, 1948, C. Johansen.

This subspecies occurs from southern British Columbia to southern California and eastward to Colorado.

5f. Ischnus inquisitorius atricollaris (Walsh)

Cryptus atricollaris Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 72; ♂, ♀. Types: ♂, ♀, Illinois? (destroyed in Chicago fire of 1871).

Cryptus varius Provancher, 1874, Naturaliste Canadian, vol. 6, pp. 177, 200; ♂. Type: ♂, Quebec (lost).

Ischnus exilis Provancher, 1875, Naturaliste Canadian, vol. 7, p. 111; ♂. Lectotype: ♂, Quebec (Quebec).

Spilocryptus neomexicana Viereck, 1903, Trans. Amer. Ent. Soc., vol. 29, p. 81; ♂. Type: ♂, Beulah, N. Mex. (Philadelphia).

Sculpture of pleura and propodeum averaging a little finer and weaker, and punctures on second tergite averaging a little weaker and sparser than in the subspecies *pectoralis* and *atriceps*.

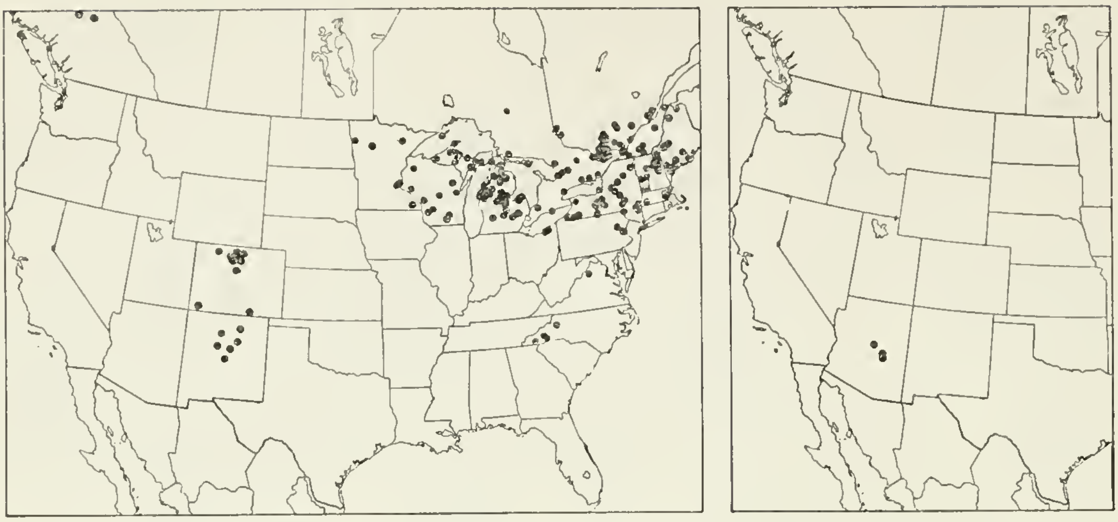
Typical male: Head black, the orbit (sometimes interrupted on upper part of temple), cheek, clypeus, and usually a central spot or all of face, white; mandible white, darkened apically; palpi white, brown apically; scape and pedicel light brown below, fuscous above; flagellum black, with a white band; propleurum entirely black or partly white; pronotum black, its front, lower, and upper edges bordered with white; mesoscutum black, with a median white spot; tegula white; mesopleurum black, with a white mark on subtegular ridge, speculum, and above sternaulus, or the latter two spots more or less enlarged and confluent; mesosternum black with a white stripe next to sternaulus, or largely white; metapleurum black or black and fulvous, white apically; apical part of propodeum white or with an irregular white band, the rest black or mostly black; scutellum and postscutellum white; front and middle coxae white to black, usually white with a distal dorsal brown spot and basal and ventral fulvous or brown areas; front and middle trochanters white or mostly white; front and middle legs beyond trochanters fulvous, their tarsi darkened apically; hind coxa fulvous to black, usually with a dorsal whitish spot; hind trochanters and femur fulvous, the first trochanter more or less darkened and apex of the femur often narrowly darkened; hind tibia fulvous, without a whitish basal band, its apical 0.3± infuscate; hind tarsus white, its fifth segment and the basal 0.2 or more of first segment fuscous; abdomen fulvous, the first segment usually partly fuscous and its apex narrowly whitish, the first tergite sometimes a little infuscate basally and its apex sometimes very narrowly whitish, the sixth and following tergites black.

Typical female: Head black, the orbit, much or all of cheek, often some or all of center of face, often small median spot on occiput behind ocelli, and some or all of clypeus, white; mandible white basally, the rest brown; palpi white, brown apically; scape and pedicel light brown, fuscous above; flagellum dark brown or blackish, with a broad white band; propleurum black or partly whitish; pronotum black, its front, lower, and upper edges broadly margined with white; tegula white; mesoscutum black or brownish ferruginous, with or without a median white spot; scutellum and postscutellum white, surrounded by black; subtegular ridge and often a stripe below sternaulus, white; rest of thorax fulvous; front and middle legs fulvous, their tarsi brownish apically and their coxae and trochanters more or less white; hind leg fulvous, the apex of its tibia a little darkened, its tarsus with second, third, more or less of apical part of first, and more or less of fourth segment, ivory; abdomen fulvoferruginous, its apex darkened, sometimes the fifth and following tergites black.

In the Alleghanian fauna this subspecies is rather constant and characteristic in color and structure. In the Canadian zone of the East, specimens tend toward the subspecies *pectoralis*, but nearly all from the eastern half of the continent are classified as *atricollaris*. Farther west, most of the specimens come under the definition of *pectoralis*, but even to the west coast of British Columbia there are some specimens with the characteristics of *atricollaris*. The zone of intergradation continues southward along the Rocky Mountains to New Mexico, narrower than in the north. We caught series containing representatives of both forms (but typical of neither) at Steamboat Springs, Colo. These and other specimens from Colorado show some tendencies in the direction of the subspecies *atriceps*, and a male from Morley, Colo., agrees entirely with the definition of *atriceps*. A female collected with this male is classified as *atricollaris*, but if its tegula were fulvous rather than white it would pass for an atypical *atriceps*. These are illustrations of the difficulty of drawing definite boundaries between our four American subspecies.

Specimens (229♂, 378♀): From British Columbia (Canim Lake, Likely, and William Lake); Colorado (near Estes Park, Fort Collins, Glen Haven, Grand Lake, Granite Peak Camp near Bayfield at 9,000 ft., La Poudre River near Indian Meadows, Lyons, Mill Gulch in Jefferson Co., Morley, Poudre Canyon west of Fort Collins, and Steamboat Springs); Illinois; Maine (Bar Harbor, near Bethel, Casco, Clayton Lake, Echo Lake on Mount Desert, Fort Kent, Monroe, Moose Head Lake near Greenville, Pittston, Rangeley, and Stratton); Massachusetts (Forest Hills, Holliston, Malden, Monterey, and Riverside); Michigan (Alger Co., Alston, Alto, Ann Arbor, Antrim Co., Atlanta, Baraga Co., Benzie Co., Brevort, Cheboygan Co., Clare Co., Crawford Co., Delta Co., Drummond Island, East Lansing, Floodwood in Schoolcraft Co., Gladwin Co., Gogebic Co., Houghton Lake in Roscommon Co., Huron Co., Huron Mts., Iron Co., Isabella Co., Isle Royale, Keweenaw Co., Lake Co., Mackinac Island, Manistee Co., Mecosta Co., Midland Co., Missaukee Co., Muskegon Co., Newaygo Co., Oakland Co., Osceola Co., Otsego Co., Perry, Saginaw Co., Schoolcraft Co., Tuscola Co., Wexford Co., and Yellow Dog Plains in Marquette Co.); Minnesota (Bovey, Itasca State Park, Norman Co., Olmsted Co., Washington Co., and White Bear); New Brunswick (Fredericton, St. Andrews, and Waweig); New Hampshire (Berlin, Conway, Dolly Copp Camp in White Mts., Franconia, Mount Madison, Mount Washington, Pinkham Notch, and Randolph); New Mexico (Cimarron at 9,500 ft., Jemez Springs, Manzano, Sandia Mts. in Sandoval Co., and Tajique); New York (Allegheny Park, Axton in Adirondack Mts., Bemus Point, Blue Mountain Lake, Cuba, Dix Hills near Huntington, Elmira, Farmingdale, Greene Co., Hancock, Ithaca, Laborador Lake in Cortland Co., Lockport, Ludowville, McLean Bogs and McLean Reservation in Tompkins Co., Milford Center, Oneonta, Oswego, Otsego Lake, Rock City in Cattaraugus Co., Shokan, Slide Mt. in Ulster Co., Spruce Top near Caroline, Syracuse, Trenton Falls, Underwood in Essex Co., Van Natta's Dam near Ithaca, Wild-Flower Preserve at Slaterville [Springs], and Wilmurt); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Highlands at 3,800 ft., Mount Pisgah at 4,800 to 5,300 ft., and Whiteside Mt. near Highlands at 4,900 ft.); Nova Scotia (Annapolis Co., Baddeck, Baddeck Forks, Berwick, Kentville, South Milford, and Truro); Ohio (Cleveland and Puritas Springs in Cuyahoga Co.); Ontario (Almonte, Bark Lake, Constance Bay, Dow's Swamp near Ottawa, Dunrobin, 10 miles east of Echo Bay, Gananoque, Gravenhurst, Honey Harbor, Lake of Bays at Norway Point, Marmora, Merivale, Normandale, Ottawa, Rockcliffe, Smoky Falls on Mattagami River, Strathroy, Swansea near Toronto, Tweed, and Waubamick); Pennsylvania (Monroe Co. and Spring Brook); Quebec (Beaupré, Chelsea, Gracefield, Hemmingford, Joliette, Kazabazua, Kirk Ferry, Knowlton, Lac Brule, Lac Mercier, Lac Saguay, Lake Opasatika, Laniel, Laurentian Mt., Messines, Montigny, Montreal, Nominingue, Norway Bay, Old Chelsea, Parke Reserve in Kamouraska Co. at 950 ft., Queen's Park in Aylmer, St. Jean River in Gaspé, Sainte-Agathe-des-Monts, South Bolton on Missisquoi River, Stoneham, Sweetsburg, Valley Junction, Vaudreuil Co., and Wakefield); Vermont (Laurel Lake near Jacksonville, Plainfield, Rutland, Stanford, and Woodstock); and Wisconsin (Belleville, Eau Claire, Gays Mills, Griffith State Nursery in Wood Co., Madison, Richland Co., Sawyer Co., Shawano Co., Trempealeau Co., and Waupaca Co.).

Most collection dates for males are from June 20 to the end of August. Those outside of this range are: May 30 in Lake Co., Mich.; June 2 and 16 at Ithaca, N.Y.; June 3 at Madison, Wis.; June 9 at



FIGURES 67, 68.—Localities: 67 (left), *Ischnus inquisitorius atricollaris;* 68 (right), *I. velutinus.*

Lac Saguay, Que.; June 12 at Nominingue, Que.; June 15 at Plainfield, Vt.; June 19 in Alger Co., Mich.; September 3 at Otsego Lake, N.Y.; September 11 at Stamford, Vt.; and October 13 at Madison, Wis. Collection dates for females are from early spring to mid-fall, the records prior to May 1 and after September 15 being: March 2 in Muskegon Co., Mich.; March 25 at Ottawa, Ont.; April 8, 27, and 28 at Ithaca, N.Y.; April 24 at Syracuse, N.Y.; April 26 at Beaupré, Que.; April 26 and 27 in McLean Bogs Reserve, Tompkins Co., N.Y.; April 28 at Forest Hills, Mass.; September 18 at Rockcliffe, Ont.; September 19 at Ann Arbor, Mich.; September 22 at La Trappe, Que.; September 23 at Kentville, N.S.; September 25 in McLean Bogs Reserve, Tompkins Co., N.Y.; September 29 at East Lansing, Mich.; October 10 and 13 at Madison, Wis.; October 17 at Aylmer, Que.; and December 6 in Midland Co., Mich.

Reared specimens are as follows: ♂, from *Malacosoma disstria,* Chelsea, Que., July 7, 1952. ♂, ♀, from *Choristoneura rosaceana,* Berwick, N.S., June 30 and July 4, 1949, O. Meekin. ♀, from leaf roller on plum, C. V. Riley collection.

We find the subspecies in moist deciduous woods, usually on foliage near the forest floor, or females sometimes on the dead leaves of the floor. Females appear with the first warm days of early spring and are among the more conspicuous of the early spring ichneumonids. Males appear about six weeks later and both sexes are common through the summer and into the fall. It is almost certain that overwintering is as adult females, probably under dead leaves.

This subspecies occurs in the Alleghanian fauna and in parts of Colorado, Wyoming, and British Columbia.

6. Ischnus velutinus, new species

Front wing of male 5.0 to 7.3 mm. long, of female 6.6 to 7.0 mm. long; body slender; clypeus narrow, in profile somewhat pyramidal; tyloids on about 5 segments, rather blunt, extending about 0.6 the length of the segments, and set slightly oblique to the long axes of the segments; mesoscutum mat, with fine, very dense, subadjacent punctures; scutellum with lateral carinae on its basal 0.3 ± in male, on its basal 0.4 ± in female, the punctures on its disc dense, separated by about 0.3 their diameter in male, almost touching in female; metapleurum with intermingled and mutually obscuring dense, fine punctures and wrinkles, those of male weaker than in female; propodeum with rather sharp, irregularly reticulate wrinkling except basad of its basal carina, its apical carina absent on its median 0.35 ±, sublaterally strong and sharp; postpetiole mat, with scattered sparse, fine, weak punctures; portion of female postpetiole behind the spiracle about 0.90 as long as wide; second tergite mat, with small, rather weak punctures that are separated by about 0.8 their diameter near center of tergite, denser on basal portion of tergite and sparser on apical portion.

Male: Head white, the central part of frons, vertex, and occiput black; palpi white, brownish apically; scape and flagellum white, fuscous dorsally; flagellum black, with a white band; propleurum, pronotum except for a transverse band across neck region and a narrow stripe on hind edge, tegula, mesosternum, prepectus except anteriorly below, mesopleurum except near subtegular ridge, metapleurum except some of its margins and a small brown subapical spot, spot in middle of mesoscutum, often irregular anterolateral stripe on lateral lobe of mesoscutum, ridges leading from base of scutellum, scutellum, postscutellum, upper division of metapleurum except for its margins, a semicircular spot on each side of propodeum basad of basal carina, and propodeum apicad of its apical carina, white, the apical white on propodeum extending forward medially; mesoscutum black or reddish brown, except where described as white; area around scutella black; front and middle coxae and trochanters white, the middle coxa with a brown dorsal spot near its apex; front and middle legs beyond trochanters fulvous, their tarsi brown apically; hind coxa fulvous, dorsally with a small basal fuscous area, a median indefinite dorsal fuscous stripe, and a subbasal dorsal white spot; hind trochanters, femur, and tibia fulvous, the apical 0.4 ± of tibia infuscate; hind tarsus white, the basal 0.3 ± of its first segment and apex of its last segment fuscous; abdomen fulvous, the first segment often partly infuscate and usually with its apex pale yellow, the second tergite often somewhat infuscate subbasally and sometimes with a subapical yellowish band.

Female: Head colored as in male except that there is usually a median fulvous stripe on frons and a small median fulvous spot on occiput just below ocelli; mouth parts and antenna colored as in male except that scape and pedicel are mostly fulvous rather than white; propleurum whitish; pronotum whitish except for a black band across neck region and a narrow black stripe along its hind edge; rest of thorax pale fulvous with paler, whitish areas and with sutural black markings on its more dorsal parts, the tegula, subtegular ridge, spot in center of mesoscutum, scutellum, and postscutellum being definitely ivory and the ground color of the mesoscutum being brownish fulvous rather than fulvous; legs fulvous, the front and middle coxae and trochanters with pale yellowish tinges, the hind tibia faintly darkened apically, and the hind tarsus brownish fulvous with the apex of its first segment, all of second and third, and basal part of fourth segment pale yellowish; abdomen uniformly fulvous.

Type: ♀, Oak Creek Canyon, Ariz., May 18, 1947, H. and M. Townes (Washington, USNM 63767).

Paratypes: 14♂, 5♀, Oak Creek Canyon, Ariz., May 13, 16, 18, and 20, 1947, H. and M. Townes (Townes). 3♂, 1♀, Parker Creek, Sierra Ancha, Ariz., May 4 and 7, 1947, H. and M. Townes (Townes). 17♂, Pocket Creek, Sierra Ancha, Ariz., May 5, 1947, H. and M. Townes (Townes).

This species occurs in moist deciduous woods of the Transition zone in the mountains of central Arizona.

7. Ischnus laevifrons, new species

Front wing of male 4.8 to 5.3 mm. long, of female 5.2 to 5.7 mm. long; body slender; frons smooth, polished, with very sparse, fine punctures (in all other Nearctic species the frons mat, with its central 0.5± rugulose and/or rather closely punctate); clypeus narrow, pyramidal in profile; tyloids on about 5 segments, elliptic, somewhat oblique to long axes of segments, extending about 0.7 the length of the segments, the segments bearing the tyloids shortened; mesoscutum strongly mat, its punctures fine and weak, these inconspicuous in male, almost invisible in female; scutellum with lateral carina on its basal 0.2± in male, on its basal 0.3± in female; metapleurum of male with fine, weak, rather close punctures, of female with fine, close moderately strong punctures that are partially obscured by dense fine wrinkling; propodeum apicad of basal carina mat and with small punctures in male, mat and ruguloso-punctulate in female, its apical carina entirely lacking; postpetiole mat, with weak, sparse punctures that are smaller and sparser in female than in male; second tergite mat, with very shallow punctures that are separated by about 0.8 their diameter.

Male: Head ivory, the central part of frons, vertex, and occiput black, the frons sometimes with a median fulvous stripe; mouth parts white, the palpi brownish apically; scape and pedicel ivory and fulvous, fuscous above; flagellum black, with a white band; propleurum ivory with a dorsolateral black area; pronotum ivory, with a broad black stripe from the middle of the hind edge across the neck and a narrow black stripe on lower part of hind edge, usually also with a small fulvous area on the side, just below the broad black stripe; mesoscutum fulvoferruginous, its margins and notauli fuscous; scutellum and postscutellum ivory, the surrounding areas partly or entirely black; mesosternum and mesopleurum fulvous, with a large ivory area over the sternaulus and covering most of lower 0.65 of the mesopleurum, the subtegular ridge ivory and dorsoposterior edge of mesopleurum black; metapleurum fulvous, narrowly fuscous along ventral half of its front edge; propodeum fulvous, its basal groove black; front and middle coxae and trochanters ivory, with some fulvous stains; front and middle legs beyond trochanters fulvous, their tarsi brownish; hind leg fulvous, segments 2–4 of its tarsus and often apex of the first segment, ivory, the fifth segment fuscous; abdomen fulvous.

Female: Similar in coloration to male but with fulvous on each side of the broad black stripe on pronotum, less ivory on mesosternum and mesopleurum, and hind tarsus entirely fulvous except that last segment is brown.

Type: ♀, Oak Creek Canyon, Ariz., May 13, 1947, H. and M. Townes (Washington, USNM 63768).

Paratypes: ♂, near Alpine, Ariz., May 29, 1947, H. and M. Townes (Townes). 6♂, 5♀, Oak Creek Canyon, Ariz., May 13, 16, and 20, 1947, H. and M. Townes (Townes).

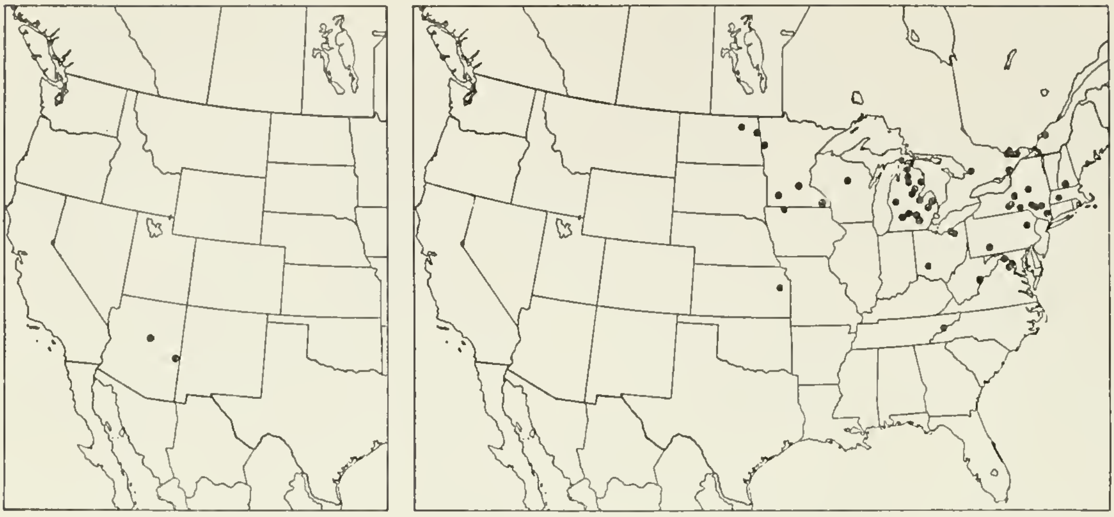
This species is known from Arizona, in the Transition and Canadian zones.

8. Ischnus rhomboidalis (Walsh), new combination

Cryptus rhomboidalis Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 72; ♀. Type: ♀, Illinois? (destroyed in Chicago fire of 1871).

Cryptus amblytelarius Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 70; ♀. New synonymy. Type: ♀, Bécancour, Que. (Quebec).

Front wing of male 4.8 to 6.4 mm. long, of female 4.0 to 6.0 mm. long; structurally similar to *I. inquisitorius atricollaris* except that it is a little smaller and stouter, flagellar segments shorter, scutellum with lateral carinae only at its basal corners, apical carina of propodeum a little weaker sublaterally and with a tendency for its median section to be suggested by stronger wrinkling, and postpetiole with fine, weak, moderately dense punctures that are separated by about 1.7 their diameter.



Figures 69, 70.—Localities: 69 (left), *Ischnus laevifrons;* 70 (right), *I. rhomboidalis.*

Coloration about as in *I. inquisitorius atricollaris* except that hind tibia has a basal or subbasal paler band of a stramineous or whitish color, white markings on thorax of female average less extensive, and female has no median pale spot on occiput below the ocelli.

This species has been confused with *I. inquisitorius atricollaris*, but can be distinguished by the paler band at the base of the hind tibia and lack of lateral carinae on the basal 0.3 of the scutellum. It is very closely related to *I. minor* and there seems to be some tendency for these two to intergrade, although all specimens at hand can be assigned to one or the other on the color of the hind coxa—fulvous in this species and black in *minor.*

The type of Walsh's name *rhomboidalis* is destroyed and the name has gone unrecognized. After study of the description it appears that Walsh was describing a small female of this species, with the hind tarsus entirely brownish. None of our specimens are entirely without white on the hind tarsus, but Walsh's observation may have been faulty, or his specimen abnormal. His statement that the basal 0.2 of the hind tibia is whitish and the stouter flagellar segments point definitely to this species.

Specimens (49♂, 51♀): From Colorado; Indiana; Iowa (Dickinson Co.); Kansas (Lawrence); Massachusetts (South Hadley); Michigan (Alcona Co., Ann Arbor, Bay City, Bois Blanc Island in Mackinac Co., Brevort, Crawford Co., Douglas Lake, East Lansing, Eaton Co., George Reserve in Livingston Co., Gladwin Co., 13 miles north of Lapeer, Newaygo Co., Ogemaw Co., Otsego Co., and Sanilac Co.); Minnesota (Carver Co., Norman Co., Preston, and Redwood Co.); New Hampshire (Jaffrey); New York (Binghamton, Canajoharie, Greene Co., Ithaca, McLean Reservation in Tompkins Co., Oliverea in the Catskills, Oneonta, Poughkeepsie, and Syracuse); North Dakota (Greenwood's Slough near Grand Forks and Stevens Township in Ramsey Co.); Ohio (Cleveland, Greene Co., and Puritas Springs in Cuyahoga Co.); Ontario (Constance Bay, Dow's Swamp near Ottawa, Gananoque, Orillia, and Ottawa); Pennsylvania (Crisp in Westmoreland Co., and Spring Brook); Quebec (Hemmingford and Queen's Park in Aylmer); Tennessee (Great Smoky Mountains state road to Newfound Gap at 3,500 ft.); Virginia (Falls Church and Rosslyn); West Virginia (Bolivar and Cheat Mt. at 2,000 ft. in Randolph Co.); and Wisconsin (Rib Mountain State Park).

Dates of collection are from mid-spring to late summer. The earliest and latest dates are: May 8 at Aylmer, Que.; May 15 at South Hadley, Mass., at Ithaca, N.Y., and at McLean Bogs Reserve, Tompkins Co., N.Y.; May 22 at Preston, Minn., and at Syracuse, N.Y.; September 10 at Cleveland, Ohio; and September 21, 22, and 25 at Bolivar, W. Va.

There is one reared specimen: ♀, from *Carpocapsa pomonella*, Carver Co., Minn., material collected Aug. 8, 1940, emergence Aug. 21,1940, Philip Marvin.

This species occurs in the Alleghanian fauna.

9. Ischnus minor, new species

Front wing of male 3.3 to 6.5 mm. long, of female 3.4 to 6.1 mm. long; body slender to moderately stout; clypeus moderately narrow to very narrow; segments of female flagellum slender to moderately stout; tyloids on 4 or 5 segments, strong, rather sharp, placed almost in line with long axes of the segments and extending about 0.85 the length of the segments; mesoscutum weakly to strongly mat, or sometimes subpolished, with small, moderately strong punctures, the punctures on lateral lobe separated by about their diameter, on median lobe slightly denser; scutellum with lateral carinae only at its basal corners; metapleurum with rather close, moderate sized punctures, in female with strong interspersed, irregular wrinkling that obscures the punctures; propodeum rugulose; apical carina of propodeum with its median 0.35± lacking, sublaterally sharp but not strong, sometimes the entire carina almost or quite lacking; postpetiole mat, with small, weak punctures that are separated by about 1.5 their diameter; second tergite mat, with fine, weak punctures that are separated by about 0.5 to 2.5 their diameter, being denser on the basal part of the tergite than on the apical part.

Male: Black. Entire face or sometimes only the sides of face, cheek, more or less of an orbital mark but always interrupted on upper part of temple and always with some mark at top of eye and bottom of temple, and mandible, white; palpi white, brownish apically; flagellum with a narrow white band, rarely the band obscure or absent; tegula, subtegular ridge, spot on scutellum and postscutellum, and sometimes stripe below and spot above sternaulus, white; rarely the front, lower, and upper margins of pronotum, and a spot in center of mesoscutum, white, and rarely a subapical tranverse band on propodeum, white; front and middle coxae and trochanters entirely white or sometimes partly blackish; front and middle legs beyond trochanters fulvous, the front tarsus brown apically and the middle tarsus brown but pale at the joints; hind coxa and first trochanter black, the coxa often white at apex; hind second trochanter more or less fulvous, fuscous, or white; hind femur ferruginous, the apical 0.12± usually infuscate, or sometimes most or all of the femur infuscate, or rarely black; hind tibia brownish, its apex blackish, sometimes its base brownish fulvous, and sometimes with a subbasal narrow, indistinct, whitish or stramineous band; first and last segments of hind tarsus black, the three middle segments and sometimes the apex of first segment, white; first tergite black, its apex sometimes ferruginous; tergites 2–4 entirely ferruginous or sometimes more or less infuscate; fifth and following tergites entirely black or sometimes the fifth tergite ferruginous basally.

Female: Black. Sometimes clypeus and facial orbits white; mandible rarely partly white; palpi fuscous or sometimes white; flagellum with a narrow to broad white band that is usually incomplete below, or sometimes the band lacking; tegula fuscous or white, the rest of thorax black except rarely for whitish marks on collar and upper edge of pronotum; front and middle coxae fuscous to fulvous basally, whitish apically; front and middle trochanters largely or entirely whitish; front and middle legs beyond trochanters ferruginous, the fifth segments of their tarsi brown; hind coxa and first trochanter fuscous; hind second trochanter and hind femur ferruginous, the apex of the femur often weakly infuscate; hind tibia ferruginous with its apex a little infuscate to dark reddish brown with its base paler, rarely with a subbasal, narrow, indistinct, paler band; hind tarsus blackish brown, its second segment usually and third segment, fourth segment, and apex of first segment sometimes, whitish; first three tergites ferruginous, the basal half of first tergite more or less infuscate; fourth tergite ferruginous or sometimes black; fifth and following tergites black.

The species is quite variable and may prove to be either a composite species or only subspecifically distinct from *I. rhomboidalis*, *I. politus*, and *I. lautus*. Specimens from the western half of its range tend to have the mesoscutum more polished, mesoscutal punctures stronger, and often the clypeus wider and female flagellum shorter than is typical for the species. In this way they approach *I. lautus*. Some females from Alaska, Yukon, British Columbia, and Colorado lack the white band on the flagellum, but females from elsewhere always have it. Large stout specimens from eastern North America seem distinguishable from *I. rhomboidalis* only on color. This is more variability and complexity than is usual, and it may be that the material is not correctly understood.

Three females at hand have the coxae and trochanters more or less ferruginous. They may be intermediates to the species *I. lautus*, off-color specimens of *minor*, or represent a new species or subspecies. Their data are as follows: ♀, King Salmon, Naknek River, Alaska, July 19, 1952, W. R. Mason (Ottawa). ♀, Thane, Alaska, July 15, 1958, W. F. Frohne (Townes). ♀, reared from *Archips argyrospilus*, Vernon, B. C., August 2, 1923, D. G. Gillespie (Ottawa). These three are not recorded on the distribution map or included in the description of the species.

Type: ♀, Mount Pisgah, 4,800 to 5,300 ft., N.C., June 21, 1940, H. and M. Townes (Washington, USNM 63769).

Paratypes (86♂, 101♀): From Alaska (Juneau, King Salmon on Naknek River, Mount McKinley National Park, Naknek on tundra, and Shaw Creek at Mile 289 on Richardson Highway); Alberta (Banff); Arizona (near Alpine and Greer); British Columbia (Aspen Grove, Cultus Lake, Lorna, Merritt, Prince Rupert, Robson, and Stanley); California (Mineralking); Colorado (Phantom Valley in Rocky Mountain National Park at 9,400 ft.); Georgia (Rabun Bald at 4,700 ft.); Idaho (Hope and Moscow Mt.); Maine (Bar Harbor and Casco); Michigan (Houghton Co., Huron Mts., Leelanau Co., Saulte Ste. Marie, and Wexford Co.); Minnesota (Itasca Park); New Hampshire (Alpine on Mount Washington, Bretton Woods, Halfway House on Mount Washington, Jaffrey, Pinkham Notch, and Randolph); New York (Bemus Point, Fish Creek in the Adirondacks, Greene Co., Hancock, The Hook in McLean Reservation, Ithaca, swamp near Oneonta at 1,900 ft., Rock City in Cattaraugus Co., Slide Mt. at 2,800 to 4,000 ft., and Trenton Falls); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Doughton Park, Hamrick, Highlands at 3,800 ft., Mount Mitchell at 4,000 to 6,500 ft., Mount Pisgah at 4,600 and 4,800 to 5,749 ft., Spence Field in Great Smoky Mountains National Park, and Wayah Bald in Macon Co. at 5,400 ft.); Northwest Territories (Norman Wells); Nova Scotia (Digby and Englishtown); Ontario (Biscotasing, Lake Agnes in Quetico Provincial Park, Miners Bay, Parry Sound, Thunder Bay Beach, and Waubamick); Pennsylvania (North East and Spring Brook); Quebec (Cherry River, Kazabazua, Knob Lake at 54°47′ and 66°47′, Knowlton, Lac Brule, Laniel, Messines, Parke Reserve in Kamouraska Co. at 950 ft., Quebec, and Sainte-Agathe-des-Monts); Saskatchewan (Waskesiu); Vermont (Laurel Lake near

Jacksonville); Virginia (Galax and Skyline Drive); Washington (Ashford, Conway, and Elbe); West Virginia (Cheat Mt. in Randolph Co.); Wisconsin (Sawyer Co.); and Yukon (Canyon Creek, Dawson, and Rampart House).

Dates of collection are from late spring to late summer. The earliest and latest dates are: May 10 and 14 at Highlands, N.C.; May 13 at Banff, Alta.; May 18 and 30 at Ithaca, N.Y.; May 23 at Mount Pisgah, N.C.; May 25 at Miners Bay, Ont.; August 25 at Laniel, Que. and on Slide Mt., N.Y. at 2,800 to 4,000 ft.; August 26 on Mount Mitchell, N.C. at 4,000 to 6,500 ft.; August 27 at Hope, Idaho; August 28 at Spring Brook, Pa.; September 2 and 5 on Mount Pisgah, N.C. at 4,600 to 5,749 ft.; and September 6 at Doughton Park, N.C.

Reared specimens are as follows: ♀, from *Acleris variana*, no further data. 2♀, from *Choristoneura fumiferana*, Stanley, B.C., Aug. 3 and 5, 1930, W. G. Mathews. ♀, from *Polychrosis viteana*, North East, Pa., 1916. Our collections of the species have been in rather dense woods, either deciduous or mixed woods.

This species is transcontinental in the Transition and Canadian zones.

10. Ischnus politus, new species

Male: Unknown.

Female: Front wing 5.2 to 5.3 mm. long; body slender; clypeus narrow; segments of female flagellum slender; mesoscutum polished, weakly mat in front, its punctures small, strong, separated by about their diameter; scutellum with lateral carinae only at its basal corners; mesopleurum polished or subpolished, with irregular small, weak punctures that are separated by about 2.0 their diameter, in some areas the punctures partly obscured by weak wrinkling; metapleurum subpolished, with rather large, weak punctures that are separated by about 0.5 their diameter, toward the hind coxa with some fine irregular wrinkling; propodeum subpolished but with an irregular surface of obscured fine wrinkling and punctures; apical carina of propodeum rather weak but distinct, its median 0.35± lacking; postpetiole weakly mat, with fine, weak, irregularly spaced punctures that are separated by about 3.0 their diameter; second tergite weakly mat, with small, rather weak punctures that are separated by about 1.5 their diameter, the punctures smaller and sparser toward apex of the tergite than basally.

Black. Cheek usually with an obscure whitish mark; palpi dark brown; band on flagellum absent or represented by a white mark on upper side of one segment; tegula dark brown; coxae and trochanters blackish brown, the second trochanters often fulvous brown; femora ferruginous, the apical 0.12± of hind femur moderately infuscate;

front and middle tibiae brownish fulvous; front and middle tarsi light brown, darker apically, pale at the joints, the middle tarsus darker than the front tarsus; hind tibia fulvous brown, its base and apex sometimes a little infuscate; hind tarsus brown, darker apically, the joints paler; first three segments of abdomen ferruginous, the basal half of the first more or less infuscate, the second and third, especially the apical margin of third, often somewhat dusky.

This is very close to *I. minor*, differing only in having a much more polished sculpture.

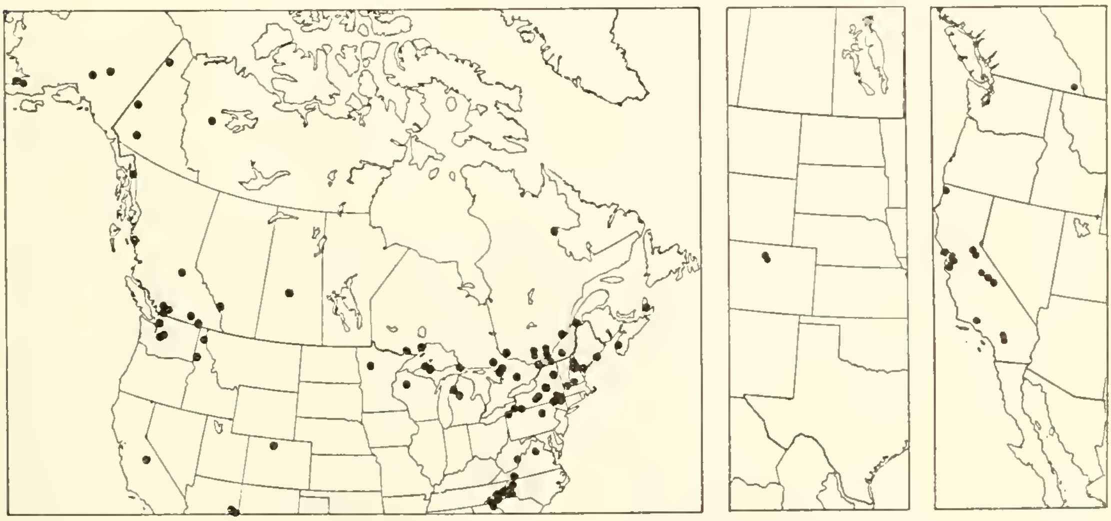
Type: ♀, Poudre Lake, Rocky Mountain National Park, 11,000 ft., Colo., Aug. 11, 1948, H., M., G., D., and J. Townes (Washington, USNM 63770).

Paratypes: ♀, Fall River Pass, Rocky Mountain National Park, 11,600 ft., Aug. 12, 1948, H., G., and D. Townes (Townes). 3♀, same data as type (Townes). ♀, Poudre Lake, Rocky Mountain National Park, Aug. 12, 1948, 11,000 ft., H., G., and D. Townes (Townes).

This species occurs at timber line in the Rocky Mountains of Colorado.

11. Ischnus lautus, new species

Front wing of male 4.8 to 6.5 mm. long, of female 4.3 to 5.0 mm. long; body stout; clypeus a little wider that other Nearctic species; tyloids on about 5 segments, moderately sharp, linear, almost parallel to long axes of the segments and extending about 0.75 their length; mesoscutum polished or subpolished, with medium-sized punctures that are unusually sharp and dense, the punctures separated by about their diameter; scutellum rather broad, with lateral carinae only at its basal corners, its punctures of moderate size, rather strong, sepa-



Figures 71–73.—Localities: 71 (left), *Ischnus minor;* 72 (center), *I. politus;* 73 (right) *I. lautus.*

rated by about their diameter; metapleurum of male subpolished, with very close, sharp punctures, toward the hind coxa usually with some fine wrinkling; metapleurum of female with close, strong punctures that are irregular and partly obscured by some rather fine but rather strong wrinkling; propodeum with moderately coarse, strong punctures that are more or less obscured among fine, irregular wrinkling; apical carina of propodeum weak, its median 0.4 lacking, but its position often traced by stronger wrinkling; postpetiole subpolished or weakly mat, in male with moderate-sized punctures that are separated by about 0.7 their diameter, in female with fine punctures that are separated by about 2.0 their diameter; second tergite weakly mat, its punctures in male moderate sized, weak, separated by about 0.5 their diameter, its punctures in female small, moderately strong, separated by about 0.7 their diameter.

Male: Black. Side of face, orbital mark at top of eye, cheek, clypeus, most of mandible, incomplete band on flagellum covering 2–4 segments, tegula, hind corner of pronotum, often a short obscure stripe at upper end of epomia, often collar and lower edge of pronotum, usually a spot on scutellum and postscutellum, rarely the mesepimeron, rarely an area behind base of hind wing, and rarely some of apical part of propodeum, white; palpi white, light brown apically; front and middle coxae and trochanters mostly white but with some ferruginous and infuscate areas; front and middle legs beyond trochanters ferruginous, their tarsi brown apically; hind coxa, trochanters, femur, and tibia ferruginous, the tibia a little darker and faintly infuscate at base and apex; first and last segments of hind tarsus fuscous or brown, the rest white; abdomen ferruginous.

Female: Black. Cheek, orbital mark on vertex, usually facial orbit, usually clypeus, tegula, hind corner of pronotum, collar, usually upper and lower margins of pronotum and subtegular ridge, usually scutellum and postscutellum, often some of apical part of propodeum, and sometimes extensive thoracic markings, white or whitish; palpi white or stramineous, pale brown apically; scape and pedicel light brown or fulvous, fuscous above; flagellum with an incomplete white band that covers about 3 segments; front and middle coxae and trochanters entirely white or more or less fulvous; front and middle legs beyond trochanters fulvous, their fifth tarsal segments brown; hind leg fulvoferruginous, its coxa sometimes with a white blotch above, its tarsus a little darkened but with the median segments usually paler; abdomen ferruginous.

In specimens from southern California the ground color of the thorax may be mostly ferruginous rather than black and the whitish thoracic markings very extensive. In these the propleurum and entire pronotum, central mark on mesoscutum, marks along notauli and lateral edges of mesoscutum, and much or most of mesopleurum, metapleurum, upper division of metapleurum, and apical 0.4 of propodeum, are white or whitish.

Type: ♀, Fish Camp, Calif., July 14, 1948, H., M., G., and D. Townes (Washington, USNM 63771).

Paratypes: ♀, Fernie, B. C., July 22, 1934, Hugh B. Leech (St. Paul). ♂, reared from *Grapholitha molesta*, Auburn, Calif., D. C. Lloyd (Washington). ♂, Berkeley, Calif., Apr. 1, 1936 (Townes). ♂, Camino, Calif., June 27, 1948, H., M., G., and D. Townes (Townes). ♀, Huntington Lake, Fresno Co., Calif., 7,000 ft., July 11, 1919, F. E. Blaisdell (Townes). ♀, reared from *Grapholitha molesta*, Kasitas [= Casitas], Calif., July 1941, D. C. Lloyd (Washington). ♂, Kings River Canyon National Park, Calif., June 26, 1948, A. T. McClay (Townes). ♀, 6 miles north of Klamath, Calif., Aug. 13, 1953, G. A. Marsh and R. A. Schuster (Berkeley). ♀, Mill Valley, Marin Co., Calif., July 7, 1950 (San Francisco). 2♂, Oakland, Calif., May 3 and 21, 1937, E. S. Ross (Townes). ♀, San Jacinto Mts., Calif., July 21, 1929, L. D. Anderson (Lawrence). ♀, Santa Cruz Mts., Calif. (Washington). 2♀, reared from *Grapholitha molesta*, Yucaipa, Calif., September 1941, D. C. Lloyd (Washington and Townes).

This species occurs from southern British Columbia to southern California.

8. Genus Habrocryptoides

FIGURE 312,a

Habrocryptoides Uchida, 1952, Ins. Matsumurana, vol. 18, p. 19. Type: *Habrocryptus shikokuensis* Uchida; original designation.

Pseudischnus Walkley, 1954, Journ. Washington Acad. Sci., vol. 44, p. 219. New synonymy. Type: *Ischnus oregonensis* Cushman; original designation.

Front wing 3.7 to 9.2 mm. long; body proportions moderate; frons unarmed; clypeus rather small, strongly convex, often pyramidal in profile, its apical margin convex or truncate, without a median tooth; mesoscutum rather strongly convex, mat or more or less polished, with fine, rather close punctures; notaulus sharp, reaching beyond center of mesoscutum; epomia usually weak, sometimes absent; propodeum rather narrow and convex, its transverse carinae complete, the apical transverse carina forming weak sublateral crests, often weak in the middle and rarely absent medially; propodeal spiracle circular or short elliptic; areolet pentagonal, its sides rather strongly convergent; ramellus short, sometimes absent; nervulus opposite basal vein; mediella moderately arched; nervellus broken near its lower end; axillus close to anal margin; first abdominal segment moderately widened apically, its spiracle far beyond the middle, subbasally without a lateral point or with a weak point; dorsolateral and ventrolateral longitudinal carinae of first abdominal tergite distinct, usually complete but weak; dorsal carinae of first tergite moderately strong, reaching beyond the spiracle; second tergite mat, with fine, close or moderately close punctures; tergite 7 not marked with white; ovipositor sheath 0.30 to 0.9 as long as front wing; ovipositor somewhat compressed, its tip usually sagittate.

This genus contains the eight Nearctic species described below, *Habrocryptus shikokuensis* Uchida 1936, and *Cryptus alberti* Ashmead 1906, from Japan, and undescribed species from Burma, Chile, and southern Brazil. *Habrocryptoides alberti* (Ashmead) is a new combination. It is not certain that the genus, as constituted, is a natural one; yet there is not sufficient evidence at this time to warrant subdividing it.

Key to the Nearctic species of Habrocryptoides

1. Apical carina of propodeum about 30° from the horizontal at the position of propodeal crest; ovipositor sheath about 0.45 as long as front wing . . . 2
   Apical carina of propodeum about 45° from the horizontal at the position of propodeal crest; ovipositor sheath 0.6 to 0.9 as long as front wing 5
2. Male clasper with a long, fingerlike apical process; dorsal valve of ovipositor with an abruptly tapered point (shaped about as in *Agrothereutes lophyri*, fig. 327,f); female flagellum without a white band.
   1. **oregonensis** (Cushman)
   Male clasper without an apical process, its apex simply rounded; dorsal valve of ovipositor with a gradually tapered point; female flagellum with a median white band 3
3. Mesoscutum fulvous with fuscous margins (at least the lateral lobes fulvous), in the male with a median white spot; punctures on lateral lobe of mesoscutum separated by about 1.3 their diameter . . . 2. **rufifrons** (Walsh)
   Mesoscutum black with a central white spot; punctures on lateral lobe of mesoscutum separated by about 0.7 their diameter 4
4. White orbital mark not interrupted on temple; segments 2–4 of male hind tarsus white . . . . 3. **virgeus,** new species
   White orbital mark interrupted on upper part of temple; segments 2–4 of male hind tarsus fuscous . . . . 4. **pictus,** new species
5. Metapleurum black with its upper 0.6 white; frons polished and punctate.
   5. **lumbarius,** new species
   Metapleurum entirely black or with a ferruginous tinge dorsally; frons more or less mat, also with punctures 6
6. Apical transverse carina of propodeum absent on median 0.5 of propodeum; hind coxa with a basal dorsal yellow area; apical half of clypeus deflexed and almost flat . . . . 6. **erasus,** new species
   Apical transverse carina of propodeum complete, not absent medially . . . 7
7. Clypeus in profile convex with its apical 0.4 weakly concave; hind coxa with a basal dorsal yellow spot; mesopleurum polished, with rather coarse punctures . . . . 7. **nitens,** new species
   Clypeus in profile pyramidal, its apical 0.5 sharply deflexed; hind coxa without a yellow spot; mesopleurum weakly mat, with small punctures.
   8. **inflexus,** new species

1. Habrocryptoides oregonensis (Cushman), new combination

Front wing 5.3 to 7.0 mm. long; thorax stout; frons rugulose mat, with small, indistinct, moderately dense punctures; clypeus rather small, rather strongly convex but its apical 0.35 flattened and its apicolateral corner a little reflexed; mesopleurum with fine irregular wrinkling medially and fine, close punctures peripherally; apical carina of propodeum complete but its median section rather weak, sublaterally forming a distinct but weak crest, where the carina rises mesad at about 35° from the horizontal, then turns strongly forward; second tergite of female with rather dense short hair; male clasper constricted abruptly and continued apically as a fingerlike or rodlike lobe; ovipositor sheath about 0.37 as long as front wing; ovipositor rather stout, its upper valve with a sharp dorsal edge at the nodus and beyond the nodus curved downward to a relatively abrupt point; apical teeth on lower valve of ovipositor very close together. In all other species of the genus the male clasper is unspecialized, with a rounded apex, and the dorsal valve of ovipositor is more gradually tapered to the apex.

There are two subspecies, as keyed and described below:

1. Hind coxa of female black; range: South Dakota.
1a. oregonensis coxalis, new subspecies
Hind coxa of female ferruginous; range: British Columbia to California.
1b. oregonensis oregonensis (Cushman)

1a. Habrocryptoides oregonensis coxalis, new subspecies

Male: Unknown.

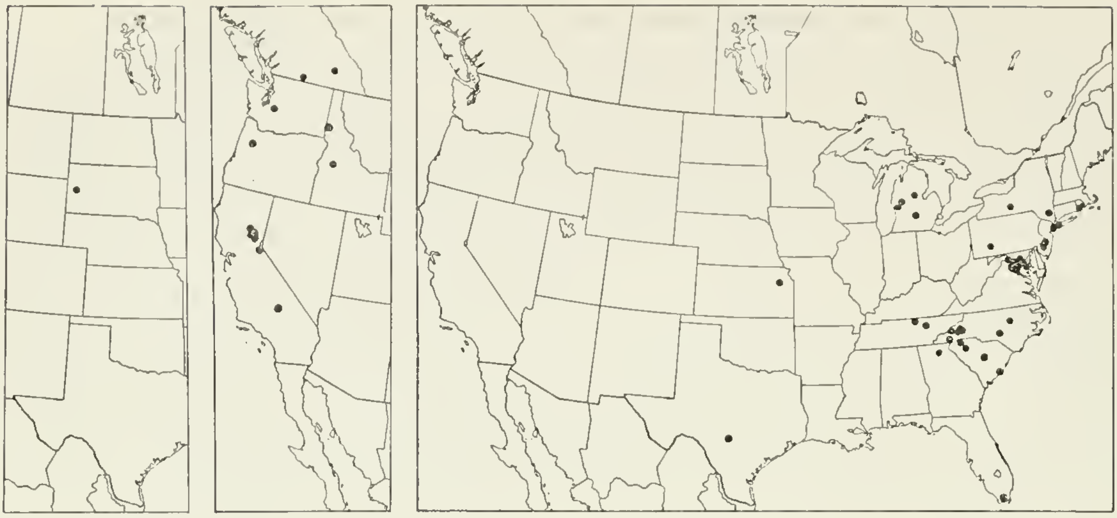
Female type: Colored like the female of the subspecies *oregonensis* except that all coxae and trochanters are blackish, front and middle legs beyond trochanters are dark brown, and hind tibia and tarsus are infuscate with the tarsal joints brown.

Type: ♀, 9 miles south of Deadwood, S. Dak., Aug. 25, 1948, H. E. Evans (Ottawa).

1b. Habrocryptoides oregonensis oregonensis (Cushman), new combination

Ischnus oregonensis Cushman, 1939, Journ. Washington Acad. Sci., vol. 29, p. 392; ♂, ♀. Type: ♀, Sweet Home, Oreg. (Washington).

Male: Black. Face, clypeus, cheek, orbit except on upper 0.45 of temple, mouth parts, scape except behind, lower 0.6 of propleurum, collar, upper and lower edges of pronotum, tegula, subtegular ridge, upper part of mesepimeron, central spot on mesoscutum, scutellum, central trapezoidal area on propodeum, usually a connecting small mark on propodeal crest, large anteroventral spot on mesopleurum, small spot on mesopleurum next to middle coxa, spot covering upper 0.6± of metapleurum, and front and middle coxae and trochanters,



Figures 74–76.—Localities: 74 (left), *Habrocryptoides oregonensis coxalis;* 75 (center), *H. o. oregonensis;* 76 (right), *H. rufifrons.*

white; front and middle legs beyond trochanters fulvous, their tarsi brownish apically; hind coxa and trochanters black or fuscous, the coxa with a large basodorsal white spot; hind femur fulvous; hind tibia and tarsus brown, the tarsal joints paler; wings hyaline; abdomen fulvoferruginous, the basal 0.7± of its first segment and all beyond sixth segment black.

Female: Black. Orbit rather narrowly white, the white interrupted on upper half of temple and usually with a narrow interruption on frons; mandible and apical half of clypeus brown; palpi light brown; antenna dark brown; part of lower edge of pronotum brown or whitish; collar and more or less of upper edge of pronotum whitish; tegula brown; subtegular ridge brown or whitish; scutellum usually fulvous or whitish; propodeum usually with a median fulvous area; metapleurum usually with a dorsal ferruginous area; front and middle coxae and trochanters brown, the coxae sometimes partly fulvous; front and middle legs beyond trochanters fulvous; hind coxa, trochanters, and femur fulvous, the coxa often with brownish tinges; hind tibia and tarsus fulvous brown, the tarsus paler at joints; wings weakly brownish; abdomen fulvous.

Specimens: 2♀, Keremeos, B. C., July 28 and 30, 1933, C. B. Garrett (Ottawa). ♂, from *Neodiprion* sp., Woodbury Creek, B.C., Mar. 11, 1953 (Ottawa). ♀, Echo Lake, Calif., July 19, 1933, E. C. Zimmerman (Washington). ♀, Echo Lake, 7,400 ft., Calif., June 26, 1952, W. W. Middlekauff (Berkeley). ♂, 4♀, Howland Flat [in Sierra Co.], [Calif., July 1953,] R. L. Lyon and G. R. Stroble (Washington). ♂, Jordan Peak in Sequoia National Forest, Calif., collected on *Abies magnifica* Sept. 10, 1947, emerged Sept. 19 to Oct. 14, 1947, G. Cecil (Washington). ♀, La Porte in Plumas Co., Calif., Oct. 25, 1952 (Washington). ♀, Meadow Valley, Plumas Co., 6,000 to 7,000 ft., Calif., Aug. 16, 1956, H. Ruckes, Jr. (Berkeley). ♀, Norden, Nevada Co., Calif., July 28, 1940 (Berkeley). ♂, Collins, Idaho, July 27, 1898, C. V. Piper (Washington). ♂, Donnelly, Idaho, M. M. Furniss, from sawfly cocoon (Washington). 4♂, 3♀, Sweet Home, Oreg., June 28, 1937, from *Neodiprion tsugae* (Washington, San Francisco, and Townes). 2♀, Mount Rainier at 4,700 ft., Wash., July 19, 1940, H. and M. Townes (Townes). ♀, Mount Rainier at 4,000 ft., Wash., July 22, 1940, H. and M. Townes (Townes). ♂, Grand Teton National Park, Wyo., July 1947, R. M. Bohart (Townes). ♀, "Yp. Poddy Cr.," August 5 (Washington).

This subspecies ranges from British Columbia to Colorado and Oregon, and down the Sierra Nevada of California.

2. Habrocryptoides rufifrons (Walsh), new combination

Cryptus rufifrons Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 75; ♀. Type: ♀, Illinois? (destroyed in Chicago fire of 1871).

Front wing 3.7 to 6.5 mm. long; thorax short and stout; frons strongly mat, with small indistinct punctures that are separated by about 0.8 their diameter; clypeus small, strongly convex, its apical third steeply declivous and a little flattened, its apicolateral corner a little reflexed; mesopleurum subpolished, its punctures rather coarse and strong, centrally crowded to result in being partly obscured by rugulosity (at least in female), peripherally sparser and distinctly separated; apical carina of propodeum complete, sublaterally forming a distinct crest (where it varies from almost horizontal to inclined by 40°), mesad of the crest turning strongly forward; hairs on second tergite of female moderately dense; ovipositor sheath about 0.32 as long as front wing; ovipositor moderately slender, in profile its dorsal valve weakly concave between nodus and apex.

Male: Head whitish, the median part of frons and vertex and upper half of occiput black; mouth parts white; antenna dark brown, the scape and pedicel white beneath; propleurum, broad upper and lower edges of pronotum, mesosternum, lower 0.3± of mesopleurum, tegula, subtegular ridge, upper end of prepectus and of mesepimeron, spot in center of mesoscutum and often a small spot on mesoscutum next to base of front wing, scutellum, postscutellum, sometimes spot in middle of propodeum, front and middle coxae, and front and middle trochanters, ivory white; mesoscutum fulvous with its margins and notauli black, sometimes with its median lobe mostly or entirely black; trough of pronotum, upper 0.25± of mesopleurum, and areas around scutella black or infuscate; front and middle legs beyond trochanters light fulvous, their tarsi brown, paler below and at joints; hind coxa, trochanters, and femur fulvous; hind tibia brown; hind tarsus white, its last segment and basal 0.35 of first segment brown; wings hyaline; abdomen fulvous.

Female: Fulvous. Orbit, palpi, upper and lower margins of pronotum, tegula, subtegular ridge, and scutellum, yellowish white; pedicel and flagellum blackish brown, the flagellum with a white band that covers about 4.5 segments and is light brown below; margins of mesoscutum, area around scutella, and mesopleurum just below subtegular ridge, fuscous; fifth segments of tarsi brown; segments 2–4 of hind tarsus pale fulvous; wings hyaline.

Specimens (161♂, 85♀): From District of Columbia (Georgetown and Washington); Florida (Paradise Key); Georgia (Blood Mt.); Kansas (Douglas Co.); Maryland (Cabin John, Glen Echo, near Great Falls, Mayo, Patuxent Refuge near Bowie, Plummers Island, near Rockville, and Takoma Park); Michigan (East Lansing, Gladwin Co., Muskegon Co., and Newaygo Co.); New Jersey (Clementon and Moorestown); New York (Farmingdale, Flatbush, Greene Co., and and Ithaca); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Hamrick, Highlands, Marshall, Mount Mitchell, Raleigh, and Southern Pines); Pennsylvania (Crisp in Westmoreland Co.); Rhode Island (Westerly); South Carolina (Columbia, Greenville, McClellanville, and Table Rock State Park); Tennessee (Burrville and Standing Stone State Park near Allons); Texas (Kerrville); Virginia (Arlington, Dunn Loring, Falls Church, Glencarlyn, Great Falls, Rosslyn, and Veitch); and West Virginia (Bolivar).

Dates of collections are from late spring to mid-fall. Those before June and after October are: April 2 at Kerrville, Tex.; April 4 and May 23 and 31 at Raleigh, N. C.; April 8 at Bowie, Md.; April 12 at Paradise Key, Fla.; May 5 to 7 in Standing Stone State Park, near Allons, Tenn.; May 16, 18, 19, and 20 at McClellanville, S. C.; May 30 in Douglas Co., Kans.; November 3 and 4 on Plummers Island, Md.; November 7 at Arlington, Va.; and November 15 at Bowie, Md.

The species is particularly common from mid-summer to early fall. Its habitat is moist or mesophytic deciduous woods, rather low in the bushes, usually not more than 60 cm. above the ground and frequently at about 12 cm. This species occurs in the Carolinian and Austroriparian faunas.

3. Habrocryptoides virgeus, new species

Front wing 4.7 to 6.5 mm. long; thorax of moderate proportions; frons strongly mat, a little rugulose, and with rather dense, moderate sized punctures; clypeus moderately wide, rather strongly convex, its apical 0.35 flattened and strongly declivous, its apicolateral corners somewhat reflexed; mesopleurum weakly mat and centrally with a little weak wrinkling, its punctures of moderate size, strong, rather close in male, crowded in female; apical carina of propodeum strong, complete but its median section usually weak, sublaterally elevated as a weak crest, at the crest about 20° from the horizontal, more mesad turning strongly forward; ovipositor sheath about 0.30 as long as front wing; ovipositor rather stout, its upper valve with a straight taper from nodus to apex.

There are eastern and Rocky Mountain subspecies, as keyed and described below:

1. Hind basitarsus of male with its basal 0.25 to 0.6 fuscous, the rest white; segments 2–4 of hind tarsus of female whitish; clypeus in profile with its apical 0.35 approximately flat; range: Carolinian fauna.
   3a. virgeus virgeus, new subspecies

   Hind basitarsus of male entirely fuscous or its extreme apex white; segments 2–4 of hind tarsus of female brownish fulvous; clypeus in profile with its apical 0.35 distinctly concave; range; Colorado and Arizona.
   3b. virgeus ardalus, new subspecies

3a. Habrocryptoides virgeus virgeus, new subspecies

Apical 0.35 of clypeus (in profile) flat or weakly concave, obliquely declivous.

Male: Head white, the median portion of frons and vertex and the occiput black; mouth parts white; antenna black, the scape white except behind; propleurum, broad upper and lower margins of pronotum, spot in center of mesoscutum, sometimes a small spot on mesoscutum next to base of front wing, scutellum, postscutellum, tegula, subtegular ridge, upper part of prepectus, mesepimeron, large mark on lower part of mesopleurum, stripe along mesal side of sternaulus, upper hind part of metapleurum, central spot on propodeum which continues laterad along apical carina, and front and middle coxae and trochanters, white; upper side of first trochanters brown; thorax black except where described as white and except that a large part of propodeum, of metapleurum, and sometimes small areas on mesopleurum are fulvoferruginous; femora fulvous, the apex of hind femur infuscate; front and middle tibiae and tarsi stramineous, the tarsi brown apically; hind coxa and trochanters fulvous, the base of first trochanter fuscous or brownish above; hind tibia dark brown, paler basally; hind tarsus white, the basal 0.25 to 0.6 of its first segment and apical 0.5± of its last segment fuscous; wings hyaline; abdomen fulvous, the apex of its first segment white.

Female: Head black, with a broad orbital ring and median stripe on face, white; clypeus and mandible white to fulvous; palpi brown, the second segment of maxillary palpus white; scape brown; flagellum blackish, with a white band that covers about 5.5 segments, the band brown below; propleurum fulvous to fuscous; pronotum black, its upper and lower margins broadly black; mesonotum black, a central spot on mesoscutum, sometimes a small spot on mesoscutum next to base of front wing, and scutellum, white; postscutellum white, the rest of metanotum mostly fuscous; tegula, subtegular ridge, upper part of prepectus, and upper part of mesepimeron white, the rest of mesopleurum and mesosternum black with more or less of median and hind part of mesopleurum fulvous or sometimes yellowish; metapleurum fulvous; propodeum fulvous, often infuscate basally and its apical carina usually followed by a yellowish band; front and middle legs fulvous, their fifth tarsal segments brownish and their coxae often with external yellowish areas; hind coxa, trochanters, and femur fulvous; hind tibia and tarsus brownish fulvous, segments 2–4 of hind tarsus and apical part of segment 1 whitish; wings hyaline; abdomen fulvous.

Type: ♀, reared from cocoon of *Harrisina americana*, Kearneysville, W. Va., Aug. 4, 1938, H. A. Jaynes (Washington, USNM 63772).

Paratypes (60♂, 54♀): From Maryland (Patuxent Refuge near Bowie, Plummers Island, and Takoma Park); Massachusetts (Cambridge); Michigan (Grosse Ile in Wayne Co.); New Jersey (Bergenfield, Moorestown, and Riverton); Ohio (Puritas Springs in Cuyahoga Co.); Pennsylvania (Slippery Rock Creek in Lawrence Co.); Rhode Island (Westerly); South Carolina (Greenville); West Virginia (near Kearneysville); and Wisconsin (Madison).

Most collection dates are from May to September. Those outside of this range are: April 20 at Greenville, S.C.; April 23 and 24 on Plummers Island, Md.; April 24 at Madison, Wis.; April 26 at Bowie, Md.; October 1 at Bergenfield, N.J.; and October 29 at Bowie, Md.

Reared specimens are as follows: 9♂, 9♀, from *Harrisina americana*, Kearneysville, W. Va., Aug. 4, 1938, H. A. Jaynes. 18♂, 16♀, from *Harrisina americana*, near Kearneysville, W. Va., August 1938, H. A. Jaynes. ♂, ♀, from *Harrisina americana*, Moorestown, N.J., Aug. 4–7, 1938. ♂, 2♀, from *Carpocapsa pomonella*, Kearneysville, W. Va., August 1938, H. A. Jaynes. ♀, from *Carpocapsa pomonella*, Kearneysville, W. Va., June 2, 1938, H. A. Jaynes. The host cocoons pinned with the ichneumonids labeled as reared from "*Carpocapsa pomonella*" are cocoons of *Harrisina*, not of *Carpocapsa*, so the *Carpocapsa* host record is probably incorrect.

We find the subspecies in thickets and the undergrowth of rich woods, in the kinds of places where *Vitis* and *Harrisina* are common.

This subspecies occurs in the Carolinian fauna.

3b. Habrocryptoides virgeus ardalus, new subspecies

Apical 0.35 of clypeus (in profile) distinctly concave, abruptly declivous, resulting in a more prominent median ridge on clypeus than in the subspecies *virgeus*.

Male: Colored as in the subspecies *virgeus* except as follows: Face sometimes with a brown spot above each clypeal fovea; scape black, its front white; upper part of prepectus mostly black; mesopleurum black except for an anteroventral and a smaller posteroventral white spot; hind femur not fuscous at apex; hind basitarsus fuscous, its apex sometimes narrowly whitish; segment 2 of hind tarsus usually fuscous basally; segment 5 of hind tarsus fuscous; segment 1 of abdomen not white at apex.

Female: Colored as in the subspecies *virgeus* except as follows: Median white mark on face fulvous or white; clypeus and mandible fulvous; white band on flagellum covering only about 4 segments; mesopleurum black except that subtegular ridge is white and that there is a ferruginous spot in its posteroventral corner; metapleurum black, its dorsal part ferruginous; propodeum black, with a broad ferruginous band along its apical carina, the median part of the ferruginous band usually with whitish areas; hind tarsus fulvous, its last segment brown.

Type: ♂, Oak Creek Canyon, Ariz., May 20, 1947, H. and M. Townes (Washington, USNM 63773).

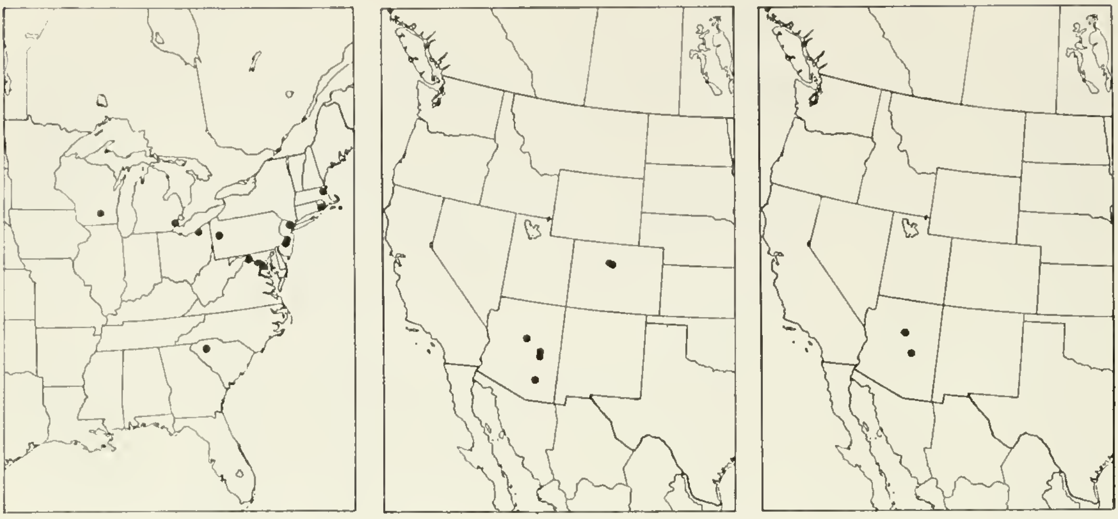
Paratypes: 7♂, ♀, Oak Creek Canyon, Ariz., May 13, 20, and 21, 1947, H. and M. Townes (Townes). ♀, Oak Creek Canyon, Ariz., Aug. 15, 1938, D. J. and J. N. Knull (Columbus). ♂, Parker Creek, Sierra Ancha, Ariz., April 25, 1947, H. and M. Townes (Townes). ♀, Pocket Creek, Sierra Ancha, Ariz., May 5, 1947, H. and M. Townes (Townes). ♂, Sabino Canyon, Ariz., emerged Feb. 20, 1920, from *Prosopis*, W. D. Edmonston (Washington). ♀, Boulder, Colo., Sept. 22, 1907, S. A. Rohwer (Washington). 3♂, University of Colorado campus, Boulder, Colo., July 24, Aug. 6 and 7, T. D. A. Cockerell (Washington).

This subspecies has been taken in Arizona and Colorado, in relatively moist deciduous woods in the Transition zone.

4. Habrocryptoides pictus, new species

Male: Front wing 4.3 to 5.2 mm. long; thorax moderately stout; frons mat, almost smooth, its punctures moderately small, separated by about 0.6 their diameter; clypeus of moderate size, in profile a rounded pyramid, its apical 0.35 flat and abruptly declivous; mesopleurum mat, with some wrinkling medially, its punctures rather coarse and strong, closest together below the middle, where they are separated by about 0.5 their diameter; apical carina of propodeum forming a sublateral crest that is almost horizontal, just mesad of the crest turning forward and obsolescent.

Head white, the middle of frons, of vertex, and back side of head black; mouth parts white; antenna black, the scape white in front;



Figures 77–79.—Localities: 77 (left), *Habrocryptoides virgeus virgeus;* 78 (center), *H. v. ardalus;* 79 (right), *H. pictus.*

thorax black, most of propleurum, wide upper and lower margins of pronotum, spot in center of mesoscutum, scutellum, postscutellum, tegula, subtegular ridge, lower 0.3± of mesopleurum, most of mesepimeron, sometimes a narrow stripe mesad of sternaulus, upper half of metapleurum, and spot in center of propodeum with lateral continuations covering propodeal crests, white; front and middle legs fulvous, their coxae and trochanters white and their tarsi brown apically; hind coxa fulvous, with a small dorsal basal yellow area; first hind trochanter dark brown; second hind trochanter brown, basally with a yellowish tinge; hind femur fulvous, its apex weakly infuscate; hind tibia brown, darkest apically; hind tarsus infuscate, paler at the joints; wings hyaline; abdomen fulvous, the apex of its first segment often with a small yellow area.

Female: Unknown.

Type: ♂, Oak Creek Canyon, Ariz., May 17, 1947, H. and M. Townes (Washington, USNM 63774).

Paratypes: 7♂, Oak Creek Canyon, Ariz., May 13, 17, 19, and 20, 1947, H. and M. Townes (Townes). ♂, Pocket Creek, Sierra Ancha, Ariz., May 5, 1947, H. and M. Townes (Townes).

5. Habrocryptoides lumbarius, new species

Male: Unknown.

Female type: Front wing 4.0 mm. long; thorax rather low and long; frons polished, with moderate sized punctures that are separated by about their diameter; clypeus short, its basal half moderately convex, its apical half distinctly concave, polished, its apical margin broadly truncate; mesopleurum polished with wrinkling below subtegular ridge, in front of speculum, and at sternaulus, its punctures of moderate size, rather strong, separated by about 1.2 their diameter;

apical carina of propodeum complete, a little stronger at position of the crest where it slopes upward at about 50°, more mesad turning a little more strongly upward and forward; hairs on second tergite sparse, the hair sockets separated by about 2.5 the length of the hairs; ovipositor sheath 0.80 as long as front wing; ovipositor rather slender; upper valve of ovipositor in profile slightly concave between nodus and apex.

Head black, the face brownish, the orbit broadly ivory with a short interruption on cheek and a wide interruption on upper part of temple; mouth parts brown; antenna dark brown, the scape paler; thorax black, the upper and lower margins of pronotum broadly, tegula, subtegular ridge, scutella, broad somewhat oblique stripe on posteroventral part of mesopleurum, mesepimeron, and upper 0.6 of metapleurum, white; legs fulvous, their tarsi brownish fulvous and front and middle coxae with some whitish stains on outer side; wings hyaline; abdomen fulvous.

Type: ♀, Lancaster, Calif., Apr. 10, 1936 (Washington, USNM 63775).

6. Habrocryptoides erasus, new species

Male: Unknown.

Female type: Front wing 4.8 mm. long; thorax of normal proportions; frons weakly mat, its punctures small, weak, separated by about 1.4 their diameter; clypeus short and wide, its apex broadly truncate, in profile forming a low pyramid with its basal half a little convex and its apical half flat; mesopleurum subpolished, with fine, weak wrinkling medially, its punctures fine, weak, and separated by about 1.5 their diameter; apical carina of propodeum forming a sublateral crest that slopes upward at about 60°, absent mesad of the crest; hair sockets on second tergite separated by about the length of the hairs; ovipositor sheath 0.66 as long as front wing; ovipositor moderately stout, its upper valve in profile straight between nodus and apex.

Head black, the orbit white except for a wide interruption on upper part of temple, the clypeus and a median spot on face brown; mouth parts brown; antenna black, the flagellum with a median incomplete white band that covers 4 segments; thorax black, the collar, upper margin of pronotum, stripe on lower front margin of pronotum, and subtegular ridge, white; tegula brown with a small white spot on its hind corner; coxae brown, the front and middle coxae with a whitish blotch externally and the hind coxa with a white dorsal basal spot; legs beyond coxae brownish fulvous; wings hyaline; abdomen fulvous.

Type: ♀, Oldman River, Lethbridge, Alta., June 22, 1956, O. Peck (Ottawa).

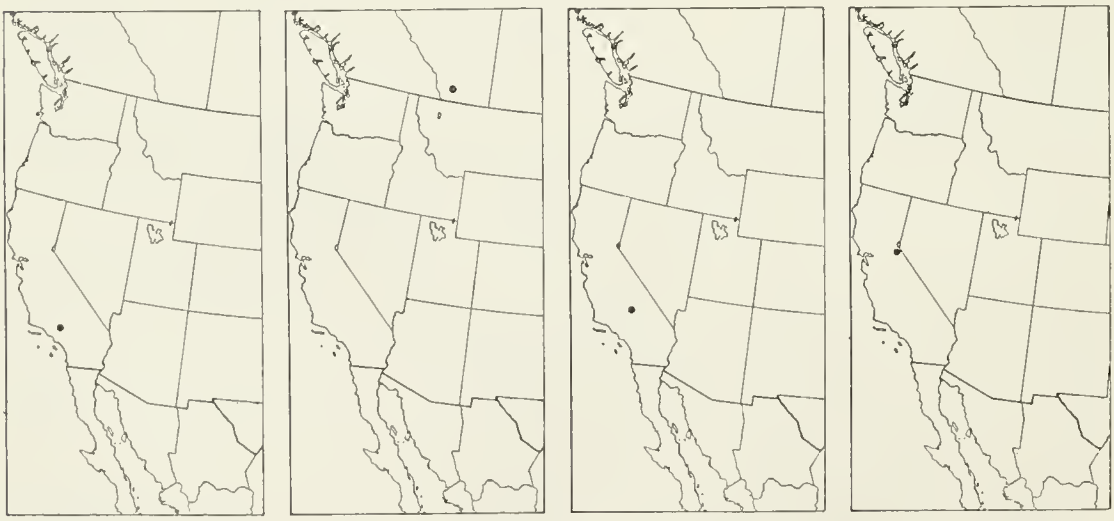
7. Habrocryptoides nitens, new species

Male: Unknown.

Female type: Front wing 5.4 mm. long; thorax of normal proportions; frons mat, its punctures fine, weak, separated by about 1.3 their diameter; clypeus wide, short, its apical margin broadly truncate, in profile shaped like a sharp pyramid with its basal half almost flat and apical half weakly concave; mesopleurum rather weakly mat, medially with fine, rather weak wrinkling, its punctures small, weak, separated by about their diameter; apical carina of propodeum sharp except on its median 0.3, where it is obsolescent, sublaterally forming a short weak crest which slopes upward at about 60°, mesad of the crest turning forward and upward a little more strongly; hair sockets on second tergite separated by about 1.3 the length of the hairs; ovipositor sheath 0.56 as long as front wing; ovipositor stout, its upper valve in profile a little convex between nodus and apex.

Head black, with a large median white spot on face, the orbit white except for an interruption on upper part of temple and a narrow subcomplete interruption on cheek; mouth parts brown; antenna black, brown apically, two of its median segments whitish above; thorax black, the collar, upper margin of pronotum, stripe on lower front margin of pronotum, and subtegular ridge, white; tegula fuscous, its hind corner white; coxae fulvous, the front and middle coxae mottled with brownish and whitish on the outer side; first trochanters brown; front and middle legs beyond first trochanters fulvous; hind femur and second trochanter fulvous; hind tibia and tarsus brownish fulvous; wings hyaline; abdomen fulvous.

Type: ♀, Ridgecrest, Kern Co., Calif., Apr. 25, 1949, E. G. Linsley, J. W. MacSwain, and R. F. Smith (Berkeley).



Figures 80 83.—Localities: 80 (left), *Habrocryptoides lumbarius;* 81 (center, left), *H. erasus;* 82 (center, right), *H. nitens;* 83 (right), *H. inflexus.*

8. Habrocryptoides inflexus, new species

Male: Unknown.

Female type: Front wing 5.1 mm. long; thorax of moderate proportions; frons mat, its punctures very fine but sharp, separated by about 1.8 their diameter; clypeus short, its apical margin very weakly arched, in profile rather evenly convex except that its apical 0.4 is flattened; mesopleurum polished, with wrinkling medially but no punctures, elsewhere the punctures moderately coarse, sharp, separated by about 1.4 their diameter; apical carina of propodeum complete, rather strong, sublaterally forming a weak crest that ascends at about 60°, mesad of the crest sloping upward a little more strongly; hairs on second tergite very sparse, their sockets separated by about 3.5 the length of the hairs; ovipositor sheath 0.77 as long as front wing; ovipositor of moderate thickness, its dorsal valve in profile a little concave between nodus and apex.

Head black with the orbit yellow from upper part of face to top of eye (with a short interruption opposite antennal socket) and with irregular yellow blotches along lower half of temple; mandible brown; palpi fulvous; antenna uniformly brown except that scape is paler in front; thorax black, the collar, upper margin of pronotum, subtegular ridge, and scutella, yellow; lower front edge of pronotum fulvous; tegula yellow; legs fulvous; wings subhyaline; abdomen fulvous, the basal half of its first segment infuscate.

Type: ♀, Woodfords, Alpine Co., Calif., June 17, 1958, W. W. Middlekauff (Berkeley).

9. Genus Trachysphyrus

Figure 312,b

Cryptus Fabricius, 1804, Systema piezatorum, p. 70. Name preoccupied by Jurine, 1801. Type: *Cryptus viduatorius* Fabricius; designated by Curtis, 1837.

Trachysphyrus Haliday, 1836, Trans. Linn. Soc. London, vol. 17, p. 317. Type: *Trachysphyrus imperialis* Haliday; monobasic.

Meringopus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 186. Type: *Cryptus recreator* Fabricius. Included by Tschek, 1870.

Itamoplex Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p.188. Type: (*Cryptus americanus* Cresson) = *albitarsis* (Cresson); designated by Viereck, 1914.

Goniocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 471, 490. Type: *Ichneumon titillator* Linnaeus; designated by Viereck, 1914.

Cosmiocryptus Cameron, 1902, Trans. Amer. Ent. Soc., vol. 28, p. 371. Type: *Cosmiocryptus violaceipennis* Cameron; monobasic.

Cyanocryptus Cameron, 1903, Entomologist, vol. 36, p. 121. Type: *Cyanocryptus metallicus* Cameron; monobasic.

Buathra Cameron, 1903, Trans. Ent. Soc. London, vol. 1903, p. 233. Type: *Buathra rufiventris* Cameron; monobasic.

Hedycryptus Cameron, 1903, Zeitschr. Syst. Hymen. Dipt., vol. 3, p. 298. Type: *Hedycryptus filicornis* Cameron; monobasic.

Plesiocryptus Cameron, 1903, Zeitschr. Syst. Hymen. Dipt., vol. 3, p. 299. Type: *Plesiocryptus carinifrons* Cameron; monobasic.

Bathycrisis Cameron, 1905, Spolia Zeylanica, vol. 3, p. 96. New synonymy. Type: *Bathycrisis striaticollis* Cameron; monobasic.

Lamprocryptus Cameron, 1910, Trans. Amer. Ent. Soc., vol. 35, p. 435. Name preoccupied by Schmiedeknecht, 1904. Type: *Cryptus kinbergi* Holmgren; original designation.

Mesocryptus Szèpligeti, 1916. Ann. Mus. Nat. Hungarici, vol. 14, p. 251. Name preoccupied by Thomson, 1873. Type: *Mesocryptus pulcherrimus* Szèpligeti: monobasic.

Pseudomesocryptus Strand, 1917, Int. Ent. Zeitschr., vol. 10, p. 137. New name for *Mesocryptus*.

Nippocryptus Uchida, 1936, Insecta Matsumurana, vol. 11, p. 3. Type: (*Hemiteles suzukii* Matsumura, 1912) = *vittatorius* (Jurine); monobasic.

Neocryptopteryx Blanchard, 1947, Comun. Zool. Mus. Hist. Nat. Montevideo, vol. 2, part 42, p. 1. Type: *Neocryptopteryx orientalis* Blanchard; original designation.

Front wing 4.3 to 13.5 mm. long; body form slender or moderately slender; frons unarmed; clypeus of moderate size, moderately convex, its apex truncate or approximately so, without a median tooth; flagellum rarely with a white band or stripe, which when present is usually basad of the middle; mesoscutum rather strongly convex, polished or subpolished, with moderately strong, coarse to fine punctures that are usually dense; notaulus usually sharp, extending beyond center of mesoscutum except that in *T. crassifemur* it does not quite reach the center; epomia nearly always present, moderately long; pronotum with a weak submarginal groove above upper end of epomia; propodeum usually rather short, both of its transverse carinae usually sharp, complete, and rather close together, the apical carina usually forming a moderately distinct sublateral crest; propodeal spiracle elongate; areolet large, pentagonal, its sides weakly to strongly convergent; ramellus present, usually well developed; nervulus opposite basal vein; mediella weakly arched, usually approximately straight except near its base and apex; nervellus broken near its lower end; first abdominal segment without a sublateral basal tooth, its postpetiole rather strongly expanded, its spiracle far behind the middle; dorsolateral and ventrolateral longitudinal carinae usually complete; median dorsal carinae of first tergite usually extending beyond spiracle, usually prominent on basal part of postpetiole; second tergite mat, in male with fine, moderately dense setiferous punctures, in female the setiferous punctures also fine but usually very sparse so that they are separated by about three times the length of the hairs, but rarely in Nearctic species (as in *luctuosus* and *moschator*), the punctures separated by a little more than the length of the hairs and in some exotic species even more closely spaced; tergite 7 without a white spot but in some exotic species margined with white or yellow; ovipositor sheath varying from about 0.4 to about 0.82 as long as front wing; ovipositor somewhat compressed, its point usually simple or somewhat sagittate.

Trachysphyrus is best represented in the Holarctic area and in the southern half of South America. There are also some species in the Oriental and Ethiopian regions. The genus contains the central core of a large group of species from which the more obviously divergent groups have been split off as genera. The process of splitting will probably proceed further when the world fauna is more thoroughly understood, but it might also be reversed to some degree. The Nearctic species included in *Trachysphyrus* are obviously related, and at present there does not seem to be a good reason to subdivide them as genera, or even as subgenera. The stronger groupings of the Nearctic species, however, are recognized as species groups. Some of the genera closely related to *Trachysphyrus* are: *Habrocryptoides, Reptatrix, Lanugo, Chromocryptus, Compsocryptus,* and the non-Nearctic *Synechocryptus, Cryptopteryx, Zonocryptus,* and *Neodontocryptus.*

Trachysphyrus is one of a group of related genera that are characteristic of more open habitats with sparser vegetation than most other Mesostenini, in our fauna the genera related to *Trachysphyrus* in morphology and habitat being *Compsocryptus, Joppidium, Lanugo,* and probably *Chromocryptus* and *Reptatrix. Compsocryptus, Joppidium,* and some species of *Trachysphyrus* are probably parasitic on larvae feeding on grass or drouth-resistant herbage and pupating in the soil. Next to nothing, however, is actually known about these. *Lanugo* and *Chromocryptus* seem to have taken to hosts that feed and spin cocoons in the bushes. Most species of *Trachysphyrus* give off a strong, musty smell when captured, reminiscent of stale chocolate and different from the characteristic smell of *Coccygomimus, Mesoleius, Exochus,* alomyines, etc. Most of our species occur in the western half of the continent.

The Nearctic species have recently been revised by Dr. H. D. Pratt (1945, Amer. Midl. Nat., vol 34, pp. 562–661). Since his descriptions are rather detailed and can be referred to if need be, the descriptions below are often sketchy or only diagnostic.

In reviewing Pratt's work on the genus, we have studied all but three of the types, and have seen a number of his paratypes and determined specimens in various collections. In the course of the review, we found that occasionally Pratt confused more than one form under a name, but that for the most part his determinations would agree with our own. Below, we have recorded and mapped only the specimens seen by ourselves; these are usually sufficient to show the distribution of the species and subspecies. Further localities are to be found in Pratt's revision. Cases where our determinations are known to disagree with his are as follows:

Albitarsis albitarsis of Pratt=*albitarsis albitarsis* plus a small percent of what we assign to *albitarsis argentifrons.*
Associatus of Pratt=*persimilis* (females) plus *ruralis* (males).
Dirus of Pratt=*dirus* plus *relativus nitschei.*
Inornatus of Pratt=*albitarsis argentifrons* plus *latigenalis.*
Mutatus of Pratt=*albitarsis mutatus* plus *mentigus rhodomerus.*
Pacificus of Pratt=*pacificus* plus *relativus punicus* and *tejonensis tejonensis.*
Tejonensis of Pratt=*tejonensis tejonensis* plus *vancouverensis.*
Temporalis of Pratt=*tejonensis mimicus* plus *relativus nitschei.*

Key to the Nearctic species groups and species of Trachysphyrus

(Males of *atritibialis, crassulus, areolatus,* and *krombeini* are not available.)

1. Axillus vein (the short vein near anal margin of hind wing) diverging from inner hind margin of hind wing. 2
   Axillus vein parallel or convergent to inner hind margin of hind wing . . 23
2. Temple strongly rugulose or rugulose-punctate; abdomen black with a weak, dark blue iridescence; hairs on head, body, and coxae long, sparse, and suberect. CYANATOR GROUP (p. 185) 3
   Temple smooth, with distinctly separated punctures; abdomen fulvous or ferruginous to black, without a bluish iridescence; hairs on head, body, and coxae varying from short to long. RECREATOR GROUP (p. 187). . . 4
3. Hind basitarsus fulvous or a little infuscate; wings faintly to distinctly infuscate; teeth on ovipositor tip projecting a little below lower edge of ovipositor so that they are conspicuous in profile (fig. 328,f). **1. murorum** (Tschek)
   Hind basitarsus fuscous; wings moderately infuscate; teeth on ovipositor tip not projecting below lower edge of ovipositor (fig. 328,g). **2. genatus** (Pratt)
4. Males 5
   Females. 14
5. Mesoscutum fulvous 6
   Mesoscutum black 7
6. Front wing yellowish, with two transverse brown bands (fig. 339). **4. fasciatus,** new species
   Front wing uniformly fuscous . . . . **9. serraticaudus** (Pratt)
7. Under side of hind femur with a weak, subapical longitudinal ridge; hairs on head brown, very long and suberect, those on temple a little longer than basal diameter of flagellum. . . . . **10. calescens** (Gravenhorst)
   Under side of hind femur without a longitudinal ridge; hairs on head whitish to dark brown, short to moderately long 8
8. Hairs on head and thorax dark brown; wings infuscate; segment 3 of hind tarsus usually black . . . . **5. dirus** (Cresson)
   Hairs on head and thorax whitish to pale brown, sometimes darker around mouth; wings hyaline to moderately infuscate; segment 3 of hind tarsus white or yellow 9

9. Frons with only a weak pit or faint depression dorsolaterad of each antennal socket 10
Frons with a distinct pit dorsolaterad of each antennal socket 11

10. Coxae fulvous; occipital carina complete, strong at its juncture with hypostomal carina; clypeus in profile with its apical half strongly concave. **3. vancouverensis** (Harrington)
Coxae black; occipital carina obsolete below, its lower end not reaching hypostomal carina or very weak near hypostomal carina; clypeus in profile with its apical half moderately concave . . . **12. asymmetricus** (Pratt)

11. Lower end of occipital carina curved strongly mesad, approaching hypostomal carina at a right angle or somewhat recurved; hypostomal carina very high; propodeum between its basal and apical carinae rather coarsely rugulose and not distinctly punctate; coxae fulvous; tegula fulvous or brownish fulvous, its front corner usually yellow . **8. pacificus** (Cresson)
Lower end of occipital carina curved mesad less strongly, approaching hypostomal carina at 60° to 85°; hypostomal carina moderately high; propodeum between basal and apical carinae rugoso-punctate or moderately rugose; coxae fulvous or black 12

12. Temple rather narrow, strongly sloping, and rather densely punctate, the temple in profile about 0.65 as long as eye; hairs on lower half of temple about 0.5 as long as basal diameter of flagellum, rising at about 60°; clypeus a little narrower than in the species below; front corner of tegula usually white . . . . **6. tejonensis** (Cresson)
Temple moderately wide, moderately sloping, its punctures moderately dense, the temple in profile about 0.8 to 1.1 as long as eye; hairs on lower half of temple about 0.7 to 1.0 as long as basal diameter of flagellum, rising at about 75°; clypeus a little wider; front corner of tegula usually not white 13

13. Punctures on lateral lobe of mesoscutum separated by about 0.8 their diameter; hypostomal carina about 2.5 as high as occipital carina. **7. relativus** (Cresson)
Punctures on lateral lobe of mesoscutum separated by about 1.5 their diameter; hypostomal carina about the same height as occipital carina. **11. symmetricus** (Pratt)

14. Apical tooth-bearing part of ovipositor about 0.35 as long as ovipositor sheath (fig. 328,n); thorax ferruginous . . . . **9. serraticaudus** (Pratt)
Apical tooth-bearing part of ovipositor not more than 0.25 as long as ovipositor sheath; thorax black, ferruginous, or fulvous 15

15. Lower edge of hind femur with a subapical, blunt, longitudinal ridge; middle femur suddenly narrowed before apex; tip of ovipositor distinctly upcurved (fig. 328,o) . . . . **10. calescens** (Gravenhorst)
Lower edge of hind femur normal, without a longitudinal ridge; middle femur gradually narrowed toward apex 16

16. Segments 2–4 of front tarsus narrower than front tibia 17
Segments 2–4 of front tarsus much wider than front tibia. 20

17. Front wing yellowish, with two transverse brown bands (fig. 339); thorax fulvous . . . . **4. fasciatus,** new species
Front wing subhyaline to black, not banded; thorax black 20

18. Frons with only a faint depression dorsolaterad of each antennal socket; ovipositor about 3.2 as long from nodus to apex as it is deep at nodus, its lower valve with distinct teeth only very near the apex (fig. 328,h). **3. vancouverensis** (Harrington)

Frons with a distinct pit dorsolaterad of each antennal socket; ovipositor about 4.3 as long from nodus to apex as it is deep at nodus, its lower valve with distinct teeth from near the nodus to the apex 19

19. Hairs on head dark brown to black; hairs on upper edge of hind tibia much sparser than on front face of hind tibia . . . . **5. dirus** (Cresson)

Hairs on head whitish to pale brown, sometimes darker near mouth; hairs on upper edge of hind tibia almost as dense as on front face of hind tibia. **6. tejonensis** (Cresson)

20. Apicolateral lobes on segments 2 and 3 of front tarsus very long on hind side, almost absent on front side (fig. 381); occipital carina incomplete below, not reaching hypostomal carina; frons with a shallow depression dorsolaterad of each antennal socket . . . . **12. asymmetricus** (Pratt)

Apicolateral lobes on segments 2 and 3 of front tarsus equally long on hind and front sides (figs. 374, 375, and 380); occipital carina reaching or almost reaching hypostomal carina; frons with a pitlike depression dorsolaterad of each antennal socket 21

21. Apicolateral lobes on segments 2 and 3 of front tarsus long, fingerlike, with very long apical bristles (fig. 380); punctures on middle and lower part of temple very sparse . . . . **11. symmetricus** (Pratt)

Apicolateral lobes on segments 2 and 3 of front tarsus shorter, subtriangular, with moderately long apical bristles (figs. 374 and 375); punctures on temple moderately sparse 22

22. Lower end of occipital carina curved mesad less strongly, approaching hypostomal carina at 60° to 85°; hypostomal carina moderately high; punctures on mesoscutum very sparse to moderately dense, usually separated by about 1.0 their diameter; segments 2 and 3 of front tarsus about 1.4 as wide as front tibia (fig. 374); thorax black or ferruginous; segments 2 and 3 of hind tarsus fuscous, ferruginous, or sometimes yellow; rugosity of metapleurum and upper side of propodeum moderately coarse; basal carina of propodeum usually partly visible . . . . **7. relativus** (Cresson)

Lower end of occipital carina curved strongly mesad, approaching hypostomal carina at 90° or somewhat recurved; hypostomal carina very high; punctures on mesoscutum dense, their interspaces about 0.5 their diameter; segments 2 and 3 of front tarsus about 1.2 as wide as front tibia, their bristles a little shorter than in *relativus* (fig. 375); thorax ferruginous; segments 2 and 3 of hind tarsus yellow; rugosity of metapleurum and upper side of propodeum very coarse; basal carina of propodeum obsolete. **8. pacificus** (Cresson)

23. Frons with a distinct pit dorsolaterad of each antennal socket; second recurrent vein simply arched; basal carina of propodeum weak or absent. LABORATOR GROUP (p. 208) 24

Frons without a pit dorsolaterad of each antennal socket; second recurrent vein simply arched or more or less distinctly sinuate; basal carina of propodeum strong, weak, or absent. ALBITARSIS GROUP (p. 219) 28

24. Thorax fulvous, with fuscous sutural markings; notaulus reaching not quite to center of mesoscutum . . . . **17. crassifemur** (Pratt)

Thorax black, sometimes with restricted yellow or fulvous markings; notaulus reaching well beyond center of mesoscutum 25

25. Abdomen entirely black . . . . **13. laborator** (Thunberg)

Abdomen red, its first segment often partly black 26

26. Lower half of frons polished, not wrinkled, with a deep pit dorsolaterad of each antennal socket; wrinkling on mesopleurum irregular, not longitudinal; hind femur moderately slender; first segment of female flagellum about 5.5 as long as wide . . . . **14. dorsicarinatus** (Pratt)

Lower half of frons transversely wrinkled, with a shallow pit dorsolaterad of each antennal socket; wrinkling on mesopleurum longitudinal, weakly so in male, strongly so in female; hind femur rather stout; first segment of female flagellum about 4.1 as long as wide 27

27. Coxae black; temple at its midheight weakly convex.
15. lochmaius, new species

Coxae fulvous; temple at its midheight almost or quite flat.
16. strigosus (Pratt)

28. Abdomen black; propodeal spiracle about 1.2 to 1.8 as long as wide 29

Abdomen mostly or entirely red, ferruginous, or fulvous; propodeal spiracle usually more than 1.8 as long as wide 30

29. Front side of areolet about 0.7 as long as outer side; ovipositor about 2.8 as long from nodus to apex as it is deep at nodus; apex of hind femur not fuscous . . . . **18. luctuosus** (Cresson)

Front side of areolet about 0.5 as long as outer side; ovipositor about 4.0 as long from nodus to apex as it is deep at nodus; apex of hind femur fuscous in the American subspecies, not or very weakly infuscate in the European subspecies . . . . **19. moschator** (Fabricius)

30. Cheek about 1.7 as long as basal width of mandible; head and thorax with long, erect, dark brown hair; epomia lacking . . **20. arcticus** (Schiødte)

Cheek about 1.0 as long as basal width of mandible; head and thorax with moderately short, appressed, usually pale hair; epomia present, usually strong 31

31. Mesoscutum with wrinkling along the notauli which partly obscures them, the notauli not sharp except anteriorly; flagellum of female often marked with white on segments 4 and 5 . . . . **21. rugosiscutum** (Pratt)

Mesoscutum without wrinkling along the notauli or with only a little wrinkling, the notauli sharp to beyond center of mesoscutum; flagellum not marked with white except in females of *krombeini* and *crassulus* . . . 32

32. Second recurrent vein with a simple arch; longitudinal carinae of first abdominal tergite rather weak; postpetiole rather narrow (especially in female). This couplet will have to be used with care, and with doubtful specimens a trial run through both halves 33

Second recurrent vein faintly to strongly sinuate, its upper half more strongly curved than its lower half and at the middle with some straighting of the curve or a reverse curvature; longitudinal carinae of first abdominal tergite moderately strong; postpetiole rather wide (especially in female) . . . 34

33. Ovipositor sheath about 0.44 as long as front wing; ovipositor straight; face of male more or less yellow medially; punctures on mesoscutum very fine and dense . . . . **22. aridus** (Pratt)

Ovipositor sheath about 0.78 as long as front wing; ovipositor gently upcurved; face of male black medially; punctures on mesoscutum moderately fine and dense . . . . **23. recurvatus** (Pratt)

34. Temple rather long, its hind 0.45 strongly convex and its front 0.55 weakly convex or almost flat; hind femur about 4.7 as long as deep 35

Temple short to moderately long, varying from almost flat to moderately convex, at least at its midheight, the convexity uniform throughout its length; hind femur 4.6 to 7.0 as long as deep 37

35. Hind basitarsus white, its base infuscate; female flagellum with a broad white band; front tibia of female inflated, rather abruptly constricted near its base. Male unknown. . . . . **27. crassulus** (Pratt)
Hind basitarsus entirely black; female flagellum without a white band; front tibia of female not inflated, gradually narrowed to its base 36

36. Ovipositor sheath 0.78 as long as front wing . . . . **25. atritibialis** (Pratt)
Ovipositor sheath about 0.47 as long as front wing.
26. mentigus, new species

37. Punctures on lateral lobe of mesoscutum moderately sparse, separated by about 1.0 their diameter; thorax of female fulvous; face of male entirely whitish, or sometimes with an incomplete, narrow, sublateral fuscous stripe; propodeum of male usually more or less fulvous; flagellum with only about 27 segments; hind tarsus of male not marked with white.
29. minimus (Pratt)
Punctures on mesoscutum usually moderately dense, usually separated by less than their diameter; thorax of female black or mostly so; face of male marked with black except in *T. ruralis*; propodeum of male entirely black; flagellum usually with more than 29 segments 38

38. Frons with coarse transverse wrinkles; tergites 2–4 weakly mat, subpolished; hind femur ferruginous; hind coxa black; hind basitarsus of male brown with its apical 0.4± pale yellow . . . . . . **35. rugifrons,** new species
Frons with fine or moderately fine transverse wrinkles or its wrinkling weak and irregular; tergites 2–4 moderately to rather strongly mat; hind femur and coxa each either black or ferruginous but if hind femur is ferruginous then hind basitarsus of male is entirely fuscous 39

39. Hind femur ferruginous and the upper margin of pronotum entirely pale yellow; sculpture of head and thorax dense, the central part of mesopleurum of both sexes rugulose, without punctures.
30. scapulatus, new species
Hind femur ferruginous or black; upper margin of pronotum usually black or mostly black, if entirely white or yellow then the hind femur black; sculpture of head and thorax less dense, the central part of mesopleurum punctate, ruguloso-punctate, or rugulose, in the male always with at least a few punctures 40

40. Speculum coarsely rugoso-punctate; temple about 0.73 as long as eye, at its midheight almost flat; hind femur black; second recurrent vein very weakly sinuate . . . . **32. latigenalis** (Pratt)
Speculum with small to medium-sized, distinctly separated punctures; temple about 0.60 as long as eye, at its midheight moderately convex 41

41. Males (Males of *areolatus* and *krombeini*, which should key to this couplet, are unknown. Males of *krombeini* should have the hind femur black; in *areolatus* it should be ferruginous.) 42
Females 44

42. Median segments of hind tarsus nearly always partly or entirely white; hind femur black or ferruginous; hind coxa black or ferruginous; apical carina of propodeum rather close to basal carina . . . . **34. albitarsis** (Cresson)
Median segments of hind tarsus brown or fuscous, paler at the joints; hind femur ferruginous; hind coxa black; apical carina of propodeum a moderate distance from basal carina 43

43. Face entirely white; upper margin of pronotum and under side of middle coxa usually marked with white . . . . **24. ruralis** (Pratt)
Face with a sublateral black stripe; upper margin of pronotum and under side of middle coxa black . . . . **28. persimilis** (Cresson)

44. Flagellum with a submedian white band; hind femur black; wrinkling on frons very weak . . . . **33. krombeini,** new species
Flagellum entirely black 45

45. Ovipositor sheath about 0.5 as long as front wing; basal and apical transverse carinae of propodeum a little closer together; hind femur black or ferruginous; hind coxa black or ferruginous . . . . . . **34. albitarsis** (Cresson)
Ovipositor sheath 0.66 to 0.91 as long as front wing; basal and apical transverse carinae of propodeum a little farther apart; hind femur ferruginous; hind coxa black 46

46. Ovipositor about 3.0 as long from nodus to apex as it is deep at nodus; second recurrent vein strongly sinuate; hind femur about 5.1 as long as deep; front tibia moderately swollen; front wing 5.0 to 7.3 mm. long. **28. persimilis** (Cresson)
Ovipositor about 4.5 as long from nodus to apex as it is deep at nodus; second recurrent vein weakly or moderately sinuate; hind femur 6.4 to 7.0 as long as deep; front tibia weakly swollen; front wing 7.5 to 9.0 mm. long . . 47

47. First abdominal tergite gradually widened near spiracles; sublateral crests of apical carina of propodeum small and weak; punctures on speculum separated by about 1.7 their diameter . . . . **24. ruralis** (Pratt)
First abdominal tergite abruptly widened just in front of spiracles; sublateral crests of apical carina of propodeum large and prominent; punctures on speculum separated by about 0.7 their diameter . **31. areolatus** (Pratt)

I. CYANATOR GROUP

Head, thorax, and coxae with sparse, unusually long, suberect hairs; temple strongly rugulose or ruguloso-punctate; frons with a shallow depression dorsolaterad of antennal socket; front tarsus of female not widened; areolet pentagonal, higher than wide, its front side about 0.6 as long as its mesal side; second recurrent vein simply arched; axillus vein distinctly diverging from margin of hind wing; abdomen black with a dull, dark blue iridescence.

This group includes the two Nearctic species treated below (one of which is Holarctic), an undescribed species from the Himalayas (Gupta collection), and judging from their descriptions also the European *Cryptus cyanator* Gravenhorst 1829 and *Cryptus balearicus* Kriechbaumer 1894. *Trachysphyrus cyanator* and *T. balearicus* are new combinations.

1. Trachysphyrus murorum (Tschek), new combination

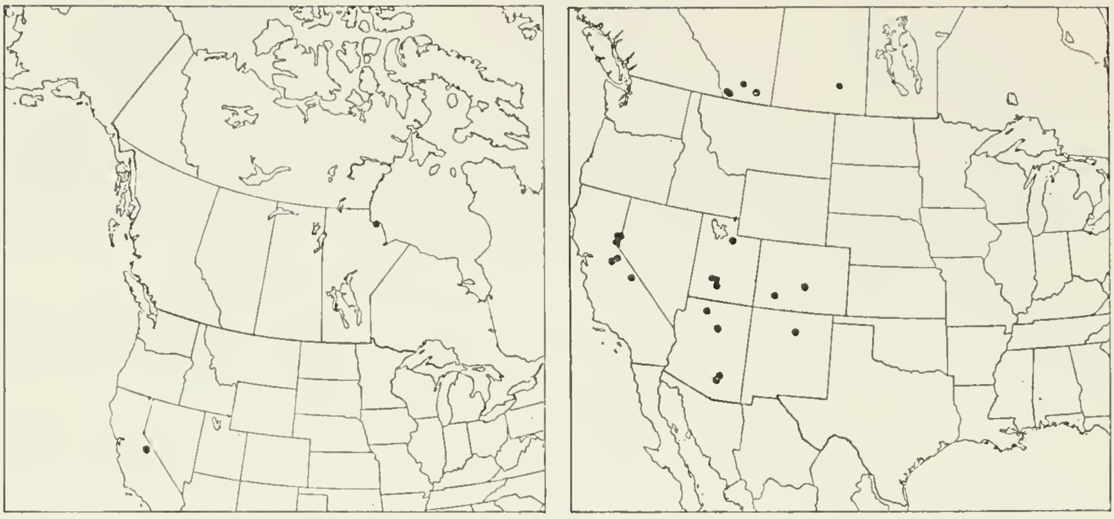
FIGURE 328,f

Cryptus murorum Tschek, 1872, Verh. Zool.-Bot. Ges. Wien, vol. 22, p. 234; ♂, ♀. Lectotype (hereby designated): ♀, Stilfserjoch, Franzenhöhe, Tirol, Austria (Vienna).

Male: Similar in color to female.

Female: Front wing 7.0 to 9.3 mm. long; profile of lower edge of ovipositor with distinct teeth as in figure 328,f.

Colored as in the female of *T. genatus* except as follows: Hind tibia fulvous basally; hind tarsus pale yellowish, its first and last segment



FIGURES 84, 85.—Localities: 84 (left), *Trachysphyrus murorum;* 85 (right), *T. genatus.*

fulvous, the apex of the last segment fuscous; wings faintly infuscate. The American females have the front femur fuscous, tinged with fulvous apically and the front and middle tibiae and tarsi brown with fulvous areas. In two European females at hand the front and middle legs beyond trochanters are fulvous with the femora black basally and tarsal segment 5 fuscous. In the female from California the wings are distinctly infuscate, in the others only faintly so.

Specimens: ♀, Tioga Pass, Yosemite Park, Calif., July 3, 1933 (Davis). ♀, Churchill, Man., July 18, 1936, H. E. McClure (Washington). 2♀, from Germany and Austria.

2. Trachysphyrus genatus (Pratt)

FIGURE 328,g

Cryptus genatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 570; ♂, ♀. Type: ♀, South Creek, Beaver Co., Utah (Washington).

Male: Front wing 9.0 to 10.3 mm. long. Coloration as in the female.

Female: Front wing 9.0 to 12 mm. long; profile of lower edge of ovipositor smooth, without distinctly projecting teeth, as in figure 328,g.

Black. Hind orbit usually with a narrow fulvous line; front and middle legs beyond femora brownish fuscous; hind femur fulvoferruginous; hind tibia tinged with fulvoferruginous basally; segments 1 and 5 of hind tarsus fuscous; segments 2–4 of hind tarsus pale brown or partly infuscate; wings moderately infuscate; abdomen with a weak dark blue iridescence.

Specimens (11♂, 34♀): From Alberta (Foremost, Lethbridge, Waterton, and Waterton Lakes); Arizona (Grand Canyon at 5,000 to 6,000 ft., San Francisco Mts., Santa Catalina Mts., and Tucson); California (Boca, Brockway, Bumble Bee in Tuolumne Co., Dardanelle, Hobart Mills in Nevada Co., Mojave Desert, and Owens Valley at 7,000 ft. in Mono Co.); Colorado (Durango and Westcliffe); New Mexico (Aspen Ranch in Santa Fe Co.); Oregon ("Buck's Creek"); Saskatchewan (Katepwa Lake near Indian Head); and Utah (Beaver Valley, Buckskin Valley in Iron Co., Kamas, and South Creek in Beaver Co.).

Most collection dates are from mid-June to mid-July. The earliest and latest records are: May 31 in Owens Valley at 7,000 ft., Mono Co., Calif.; June 8 at 5,000 to 6,000 ft. in the Grand Canyon, Ariz.; June 10 in the Santa Catalina Mts., Ariz.; and "August" at Tucson, Ariz.

There are two reared lots: ♂, ♀, from *Malacosoma fragile*, Aspen Ranch, Santa Fe Co., N. Mex., July 7, 1936, Norman Appleton. ♂, 2♀, from *Malacosoma disstria*, Lake Katepwa, Indian Head, Sask., Sept. 11, 1924, J. J. de Gryse.

This species occurs at higher altitudes in dry areas of western United States and southwestern Canada.

II. RECREATOR GROUP

Head, thorax, and coxae with hairs usually of moderate length, and except on temples the hairs usually decumbent; temple smooth or weakly mat, with distinct punctures, not rugulose; frons usually with a depression dorsolaterad of each antennal socket which varies from a deep pit to a faint impression; front tarsus of female often widened; areolet irregularly pentagonal, its outer side usually shorter than inner side; second recurrent vein simply arched, rather short; axillus vein distinctly divergent from margin of hind wing; abdomen fulvous or ferruginous to black, seldom iridescent.

This is a Holarctic group. Its species are usually in mountainous areas, where there is bare soil. Males cruise about scattered bushes with a fast, undulant flight. Females are more often seen crawling over ground with sparse vegetation. There are nine species in America and apparently a larger number in Eurasia.

3. Trachysphyrus vancouverensis (Harrington)

FIGURE 328,h

Cryptus vancouverensis Harrington, 1894, Canadian Ent., vol. 26, p. 211; ♀. Lectotype (hereby designated): ♀, Victoria, B.C. (Ottawa).

Front wing 8.5 to 11.5 mm. long; clypeus rather wide and short, its apical half strongly impressed so that in profile it is concave; frons with rather fine, irregularly transverse wrinkling, the depression dorsolaterad of each antennal socket faint or absent; front tarsus of female not at all expanded; ovipositor tip very short, without distinct teeth except near the apex, as in figure 328,h.

Face of male mostly ivory, with a submedian vertical blackish band on each side; coxae and abdomen entirely fulvoferruginous; wings of male weakly infuscate, of female rather strongly infuscate.

The cocoons from which they emerged are pinned with two of the specimens. These are broadly elliptic, yellowish white, rather dense in texture, and with a small amount of looser silk on the outside.

Specimens: ♀, Alma, Calif., June 7, 1940, Miller (Berkeley). 2♂, from lepidoptera cocoon, Angwin, Napa Co., Calif., "11.26.53," J. C. Hall (Davis and Townes). ♂, Felton in the Santa Cruz Mts. at 300–500 ft., Calif., May 20–25, 1907, J. C. Bradley (Ithaca). ♂, Hastings Natural History Reservation in the Santa Lucia Mts. near Jamesburg in Monterey Co., 1,900–2,700 ft., Calif., June 1, 1938, Michener (Townes). ♀, Los Gatos, Calif., August 1933, G. A. Hamsher (Davis). ♀, McCloud, Calif., June 22, 1914, E. C. Van Dyke (San Francisco). ♂, ♀, Mount Diablo, Calif., Apr. 21, 1934 (Davis). ♂, Paraiso Spring, Monterey Co., Calif., May 26, 1950, R. M. Bohart (Davis). ♀, Santa Rosa, Calif., May 15, 1954, E. I. Schlinger (Townes). ♀, reared from *Malacosoma*, Puyallup, Wash., May 28, 1954, E. Darley (Washington). ♀, "Mountain View," collected by Ehrhorn (Washington).

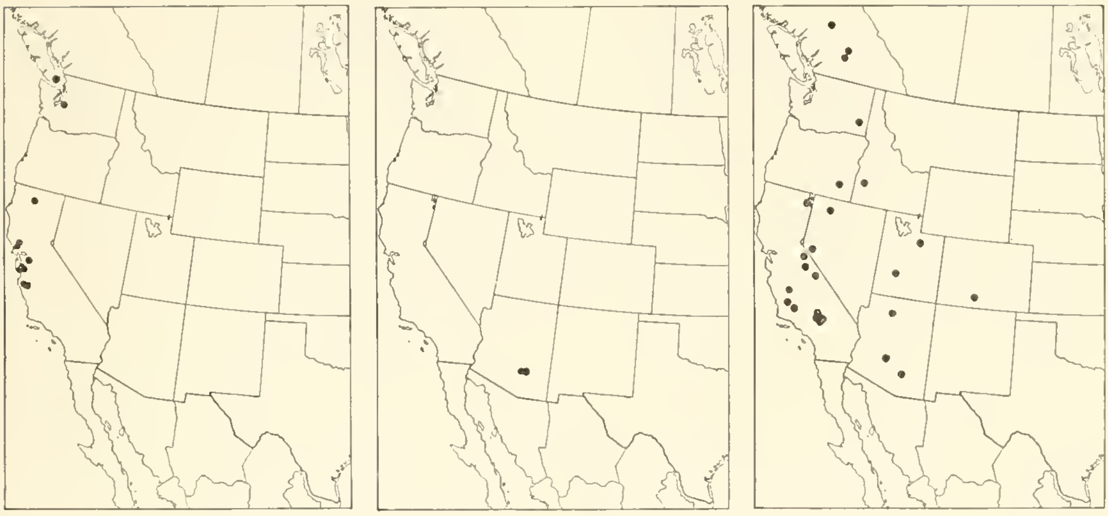
This species occurs from Vancouver Island to central California, near the coast.

4. Trachysphyrus fasciatus, new species

Figures 328,i; 339

Front wing of male 7.3 mm. long, of female 7.7 mm. long; clypeus narrow, strongly convex, in profile its apical half a little flattened; cheek about as long as basal width of mandible in female, in male a little shorter; frons finely rugulose, mat near antennal sockets, the depression dorsolaterad of each antennal socket very faint; temple moderately mat, its setiferous punctures fine and weak; punctures on mesoscutum rather small, separated by about 0.2 their diameter; mesopleurum finely rugulose, with some indistinct small punctures; front tarsus of female not at all expanded; ovipositor about 2.05 as long from nodus to apex as it is deep at nodus, its tip faintly upcurved, the teeth on its lower valve rather strong and sparse, as in figure 328,i.

Male: Fulvous. A transverse mark on lower part of frons, prepectus, sutural areas at base of scutellum, of propodeum, and of metapleurum, and metasternum, black; small area laterad of lateral ocellus and spot below subtegular ridge, fuscous; wings colored as in female but the bands a little wider and less distinct. The only male available lacks the antennae and the hind legs beyond the femur.



Figures 86–88.—Localities: 86 (left), *Trachysphyrus vancouverensis;* 87 (center), *T. fasciatus;* 88 (right), *T. dirus.*

Female: Fulvous. Flagellum dark brown, paling to fulvous basally, with an incomplete yellowish white band covering segments 5–8; areas on prepectus, metasternum, and sutural areas at base of scutellum and of propodeum and metapleurum, black; hind tibia brownish apically; segments 2–4 of hind tarsus yellow; wings yellow, the front wing with two brown bands as in figure 339, the apical part of hind wing faintly brownish.

Type: ♀, in Sonoran desert, near Roosevelt Lake, Ariz., Apr. 21, 1947, H. and M. Townes (Washington, USNM 63776).

Paratype: ♂, Roosevelt Dam, Ariz., Oct. 30, 1924 (San Francisco).

5. Trachysphyrus dirus (Cresson)

Figures 328,j; 378

Cryptus dirus Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 359; ♀. Type: ♀, California (Philadelphia).

Front wing 8.5 to 10.5 mm. long; hairs of head, thorax, and coxae moderately long; clypeus rather short and convex; cheek rather short; pit on frons dorsolaterad of antennal socket moderately deep; sides of thorax strongly rugulose; front tarsus of female not distinctly widened, as in figure 378; upper edge of hind tibia of female rather sharp, its hairs sparse; ovipositor tip normal, as in figure 328,j.

Hairs of head, thorax, and coxae dark brown or blackish; head, thorax, and legs entirely deep black except that frontal orbit is narrowly white at antennal socket and that rarely segments 3 and 4 of male hind tarsus are more or less white; wings black; abdomen red, its first segment black and second tergite of female often fuscous basally.

Specimens (22♂, 11♀): From Arizona (Grand Canyon at 7,000 ft., North Rim of Grand Canyon, Phoenix, and Santa Catalina Mts.);

British Columbia (Chilcotin, Kamloops, and Nicola); California (Bishop, Cedar Pass in Modoc Co., Coalinga, Leevining, McKittrick in Kern Co., Mojave, New Cuyama, Palmdale, 5 miles south of Pearblossom in Los Angeles Co., Rosamund, and near Sonora Pass at 8,500 ft.); Colorado (San Luis); Idaho (5 miles northwest of Murphy); Nevada (Holbrook in Douglas Co. and Valmy); Oregon (Fish Lake in Steens Mts. at 7,000 ft.); Utah (Strawberry Daniel Pass and Wildcat Valley in Beaver Co.); and Washington (Wawawai).

Collection dates are mostly from April 6 to June 29. Those outside of this range are: March 12 and 20 at Phoenix, Ariz.; March 13 in the Santa Catalina Mountains, Ariz.; July 4 near Sonora Pass, 8,500 ft., Calif.; and July 9 at Fish Lake, 7,000 ft., Steens Mountains, Oreg.

This species ranges from southern British Columbia to southern California and eastward to central Colorado, mostly in the Canadian and Transition zones. It is adult in spring and early summer.

6. Trachysphyrus tejonensis (Cresson)

FIGURES 328,k; 379

Front wing 7.7 to 12.5 mm. long; clypeus moderately wide (a little narrower than in *T. relativus*), rather strongly convex, its apical half flattened or weakly concave; frons with a pitlike depression dorsolaterad of each antennal socket; temple short (about 0.65 as long as eye in male, about 0.70 as long as eye in female), almost flat, strongly sloping, and rather densely punctate; hairs on lower half of temple about 0.5 as long as basal diameter of flagellum, rising at about 60°; front tarsus of female very little expanded, as in figure 379; ridges on lower valve of ovipositor weak, not extending basad of nodus, as in figure 328,k. Structure otherwise very similar to that of *T. relativus*.

There are two subspecies, differing in color as keyed and described below:

1. Coxae black; range: Rocky Mountain and Great Basin areas.
   6a. tejonensis mimicus (Pratt)
   Coxae ferruginous; range: Washington, California, and Arizona.
   6b. tejonensis tejonensis (Cresson)

6a. Trachysphyrus tejonensis mimicus (Pratt), new status

Cryptus mimicus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 607; ♂, ♀. Type: ♀, Jemez Springs, N. Mex. (Washington).

Cryptus temporalis Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 609; ♂, ♀. New synonymy. Type: ♀, Boulder, Colo. (Washington).

Cryptus rugulosus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 615; ♀. New synonymy. Type: ♀, Banff, Alta. (Ottawa).

Coloration as in *Trachysphyrus relativus relativus* and *T. relativus nitschei*, except that segments 2–4 of hind tarsus of female are yellowish white and that base of tegula of male is white, at least in the specimens at hand. Sometimes the femora are red (these specimens resembling *T. r. relativus*) and sometimes black (resembling *T. r. nitschei*). There seems to be a tendency for red-femured specimens to occur in the northern part of the range (as in *T. r. relativus*) and for black-femured specimens to occur in the southern part (as in *T. r. nitschei*). Judging largely from the distributional data published by Pratt, however, the ranges of both red-femured and black-femured specimens overlap or intermingle to such an extent that it seems inadvisable to keep the two forms as subspecies.

The type of *Cryptus rugulosus* is an abnormal, brachytic specimen, with the temple strongly convex and the hind femur only 3.8 as long as deep. On the basis of other characters, however, it belongs here.

Specimens (17♂, 20♀): From Alaska (Eagle); Alberta (Banff); Arizona (Bright Angel Trail in Grand Canyon and Oak Creek Canyon); British Columbia (Fort Nelson, Glenora, Hope Mt. at 6,000 ft., Lillooet, Nicola, Pavilion Lake, and Vernon); Colorado (Boulder, Fort Collins, Gothic at 9,500 ft., Longs Peak Inn at 9,000 ft., and Los Pinos); Idaho (Twin Falls and Wendell); New Mexico (Cedro Canon in Bernalillo Co., Farmington at 5,250 ft., Jemez Springs at 6,400 ft., and Santa Fe); Oregon (Corvallis and Grant Co.); Utah (Beaver Creek Hills in Beaver Co., Fort Duchesne, Logan, and Zion Park); and Washington (Mill Creek near Walla Walla and Pullman).

Most collection dates are from May 22 to August 3. Those outside of this range are: May 10 at Zion Park, Utah; May 13 in Oak Creek Canyon, Ariz.; May 19 in Cedro Canon, Bernalillo Co., N. Mex.; August 4 on Bright Angel Trail, Grand Canyon, Ariz.; and October 6 at Farmington, N. Mex.

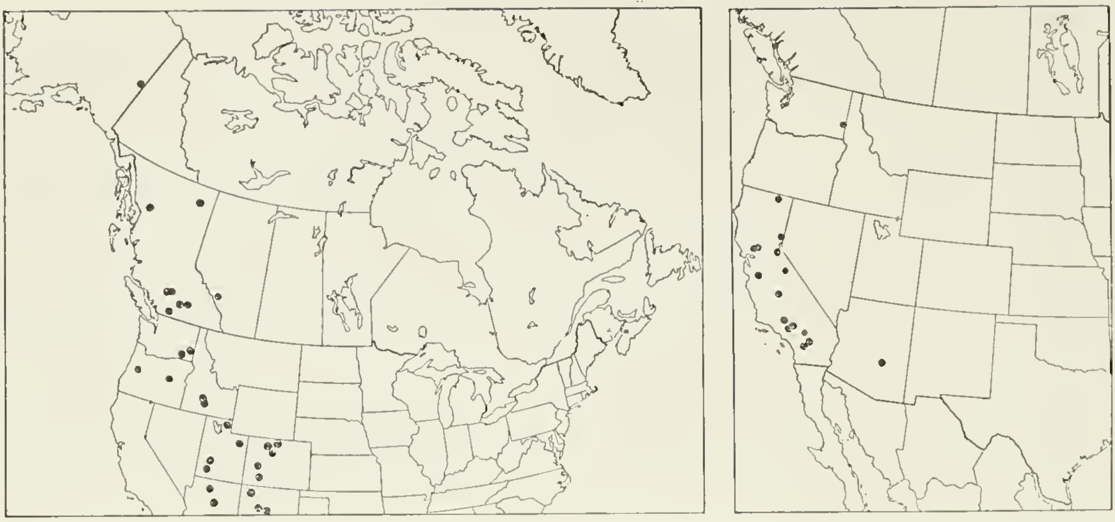
This subspecies occurs in the Rocky Mountain and Great Basin areas.

6b. Trachysphyrus tejonensis tejonensis (Cresson)

Cryptus tejonensis Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 360; ♀. Type: ♀, Fort Tejon, Calif. (Philadelphia).

Cryptus rufopedibus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 597; ♀. New synonymy. Type: ♀, Pullman, Wash. (Washington).

Male: Black. Front orbit (narrow on frons), small spot at top of eye, narrow stripe on hind orbit, spot on upper center of face, central part of clypeus, most of mandible, usually narrow stripe on subtegular ridge, usually base of tegula, and sometimes under side of front coxa and first trochanter, white; front of scape ferruginous; palpi brownish and fuscous, the second segment of maxillary palpus partly white; scutellum usually ferruginous; legs and abdomen ferruginous; hind tibia and its basitarsus fuscous; segment 2 of hind



FIGURES 89, 90.—Localities: 89 (left), *Trachysphyrus tejonensis mimicus;* 90 (right), *T. t. tejonensis.*

tarsus brown, whitish apically; segments 3 and 4 of hind tarsus white; segment 5 of hind tarsus whitish to light brown; wings faintly to moderately infuscate; apex of clasper usually infuscate.

Female: Black. Front orbit, spot at top of eye, and much of hind orbit narrowly white; most of clypeus and part of mandible ferruginous; palpi brown; scape ferruginous except on its apical margin; legs ferruginous, the hind tibia and basitarsus ferruginous brown and segments 2–4 of hind tarsus whitish; wings weakly to strongly infuscate; abdomen ferruginous.

Two males from near White Water, Calif., are unusual in having the ground color of the head and thorax entirely fulvous in one specimen, about 25% fulvous in the other.

Specimens (13♂, 8♀): From Arizona (Parker Creek in the Sierra Ancha); and California (Big Dalton Dam in Los Angeles Co., Boca, Camp Baldy in Los Angeles Co., Exeter, Idyllwild in the San Jacinto Mts., Leevining, Mammoth in Modoc Co., Pacheco Pass in Santa Clara Co., Putah Canyon in Yolo Co., San Timoteo Canyon in Riverside Co., Snow Creek near White Water at 1,500 ft., Upper Echo Lake at 7,400 ft., and 5 miles southwest of Winters).

Dates of collection are from April 6 to July 9, except for a capture on July 27 at Upper Echo Lake, 7,400 ft., Calif.

This subspecies occurs mostly in California but has been taken also in Arizona and Washington.

7. Trachysphyrus relativus (Cresson)

FIGURES 328,l; 374

Front wing 7.3 to 12.5 mm. long; clypeus wide, convex, in profile its apical half weakly concave; frons with a pitlike depression dorsolaterad of each antennal socket; temple rather wide and full, its punctures moderately dense in male, moderately sparse in female; occipital carina complete below, meeting hypostomal carina at 60° to 85°; hypostomal carina moderately high; punctures on mesoscutum and mesosterum ranging from moderately dense to moderately sparse; front tarsus of female expanded, as in figure 374; ovipositor sheath about 0.52 as long as front wing; ovipositor tip as in figure 328,l.

This is a very common species from the Rocky Mountains westward, mostly in the Canadian zone. It is usually found where there is short grass and scattered conifers. The males fly actively around the conifers. The females are seen usually crawling over the ground, among the grass tufts. Both sexes give off a strong musty odor when captured. There are three subspecies, as treated below:

1. Coxae mostly or entirely ferruginous; thorax of female ferruginous; range: Sierra Nevada to Pacific Ocean . . . . **7c. relativus punicus** (Cresson)
   Coxae mostly or entirely black; thorax of both sexes black 2
2. Hind femur mostly or entirely red; range: Rocky Mountains to crest of Sierra Nevada, from Colorado and central California northward, also locally in New Mexico . . . . **7a. relativus relativus** (Cresson)
   Hind femur mostly or entirely black; range: mostly in the Great Basin and vicinity, but occurring also through most of the range of the subspecies *relativus* . . . . **7b. relativus nitschei** (Dalla Torre)

7a. Trachysphyrus relativus relativus (Cresson)

Cryptus relativus Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 359; ♀. Type: ♀, British Columbia (Philadelphia).

Cryptus pictifrons Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 360; ♂. Type: ♂, Green River, Wyoming Territory (Philadelphia).

Male: Black. White markings as described for the male of *nitschei;* scape often ferruginous or fulvous in front; palpi fuscous; front and middle legs beyond first trochanters reddish fulvous, the femora sometimes infuscate basally; hind femur red, sometimes infuscate basally; hind tibia and basitarsus brown to black; segment 5 of hind tarsus fulvous; wings subhyaline; more or less of apical part of first abdominal segment and all of following segments red; apex of clasper often infuscate.

Female: Colored like female of *nitschei* except that front and middle tibiae and all femora are red, the front and middle tarsi brownish red to dark brown, and apex of first abdominal segment red.

Specimens intermediate to the subspecies *nitschei* and *punicus* are rather common among males, scarce among females. Males intermediate between *relativus* and *nitschei* are from Mount Lyell, Calif.; Blanco's Corral, White Mt., Mono Co., Calif.; Secret Pass at 6,500 ft., Ruby Mts., Elko Co., Nev.; and Dixie, Elmore Co., Idaho. We have seen no intermediate females. Males intermediate to the subspecies *punicus* are moderately common at high altitudes in the Sierra Nevada. We and other collectors have found a number of them in Sonora Pass, California, at about 8,500 ft. The females collected in Sonora Pass, however, were all assignable to the subspecies *punicus*, though some have extensive infuscation on the head and thorax to indicate a tendency toward the subspecies *relativus*. Also in other higher parts of the Sierra Nevada there is a tendency for males to have the colors of both subspecies *relativus* and *punicus* or to be intermediate, and for females to be rather typical *punicus*. The only females truly intermediate between *relativus* and *punicus* are one from Mount Adams, Wash., collected July 24, 1921, by A. L. Melander (Cambridge) and another from Agassiz, B.C., collected Aug. 22, 1921, by G. Glendenning (Ottawa). In these, the head, thorax, and coxae are partly black, partly fulvous or ferruginous.

Specimens (64♂, 140♀): From Alberta (Banff, Calgary, Foremost, Nordegg, and Waterton); British Columbia (Aspen Grove, Chilcotin, Clinton, Copper Mountain, Fort St. John, Glenora, "Hope Summit," Kamloops, Keremeos, Mount McLean, Nicola Lake, Okanagan and Okanagan Valley, Pavilion Lake, Peachland, Robson, Taylor, Vernon, and Williams Lake); California (Bigpine, Bigpine Creek in Inyo Co. at 4,500 and 7,500 ft., Blanco's Corral on White Mt. in Mono Co. at 10,000 ft., Boca, Cedar Pass in Modoc Co., Gold Lake in Sierra Co., Hope Valley in Alpine Co., Independence Lake in Sierra Co., Inyo Co. at 9,700 ft., Leevining, Lone Pine, May Lake in Yosemite Park at 10,500 ft., near Mono Pass in Inyo Co. at 12,000 ft., Lassen National Park, Snow Flat in Yosemite Park at 8,700 ft., Sonora Pass at 8,000 to 9,000 ft., 8,500 ft., and 9,624 ft., and Winnemucca Lake in Alpine Co.); Colorado (Berkeley, Estes Park, Florissant, Fort Collins, Great Sand Dunes in Alamosa Co., Lonetree, Montezuma Co., Plainview, Salida, Troublesome at 7,345 ft., and Westcliffe); Idaho (Bear Creek Camp 10 miles north of Leslie, Bear Pass Creek in Butte Co., Challis, Dickey in Custer Co., Dixie in Elmore Co., Malta, McCall, Montpelier, Moscow Mt., Oakley, Pioneer Camp 14 miles [north] from Fairfield, Warren, and 8 miles east of Wayan); Montana (Bozeman, Columbia Falls, Helena, and Madison River in Gallatin National Forest); Nevada (Angel Creek near Wells); New Mexico (Cienega Canyon near Albuquerque, Cimarron Canyon in Colfax Co., and Jemez Springs at 7,500 ft.); Oregon (head of Blitzen River and Fish Creek at 7,200 ft. in Steens Mts., Lake Wallowa State Park, Lick Creek Ranger Station in Wallowa National Forest at 4,600 ft., and The Dalles); Utah (Beaver Mt., Emigration Canyon in Salt Lake Co., Logan, Navajo Lake at 9,000 ft., Park City, South Creek in Beaver Co., Timpanogos Mt., and Uintah Co.,); Washington (Blue Mts., Lake Cushman in

Mason Co., Mount Adams, Mount Rainier at 5,500 ft., Paradise Park on Mount Rainier, and "Sawmill Flat in Rainier National Forest"); and Wyoming (Casper, Centennial, Jackson at 6,000 ft., Lake Camp in Yellowstone Park, Laramie, Mammoth Hot Spring and Old Faithful in Yellowstone Park, Shoshone Canyon at 6,500 ft., and West Thumb in Yellowstone Park).

Collection dates are mostly from June 6 to August 20. Those outside of this range are: May 20 in Cienega Canyon, near Albuquerque, N. Mex.; May 31 at Robson, B.C.; June 2 at Bigpine, Calif.; June 2 and 4 at Florissant, Colo.; August 25 and 27 at Robson, B.C.; and September 5 at Aspen Grove, B.C.

There is one reared specimen: ♀, from *Aegeria tibialis*, Jemez Springs, N. Mex., July 2, 1929, G. P. Englehardt. Two more females of this same rearing are colored like the subspecies *nitschei*, so are classified there! We have found the subspecies very common in mountain country where there is short grass and scattered conifers.

This subspecies is found mostly in the Rocky Mountain area but occurs also in the higher parts of the Sierra Nevada, particularly on the east slopes.

7b. Trachysphyrus relativus nitschei (Dalla Torre), new status, new combination

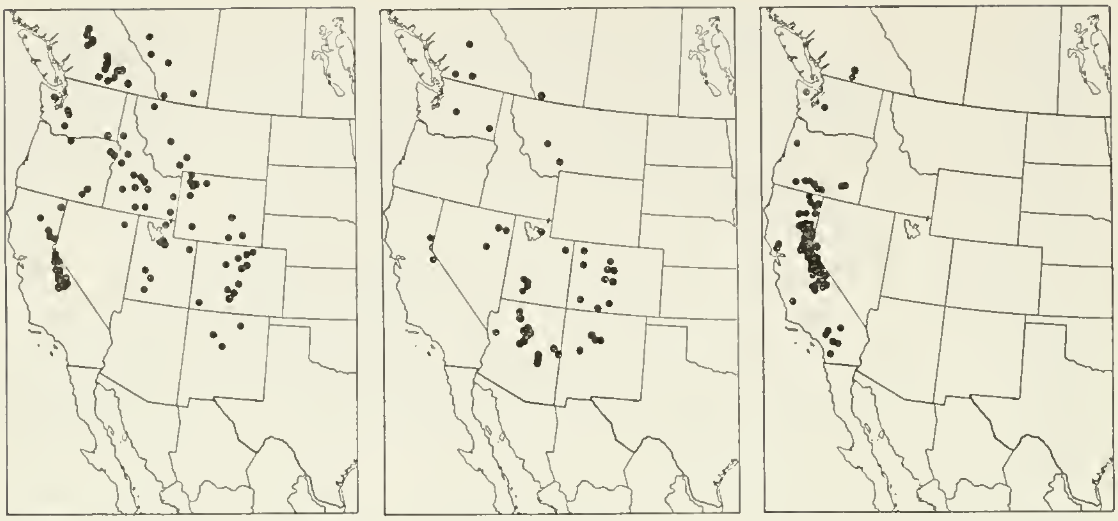
Cryptus violaceipennis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 408; ♂, ♀. Name preoccupied by Brullé, 1846. Lectotype (hereby designated): ♀, Colorado (Washington).

Cryptus leucopus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 409; ♂. New synonymy. Name preoccupied in *Trachysphyrus* by Gmelin, 1790. Type: ♂, Colorado (Washington).

Cryptus nitschei Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 581. New name for *Cryptus violaceipennis*.

Cryptus cleucopus Walkley, 1958, U.S. Dept. Agr., Agr. Monog., No. 2, suppl., p. 46. New name for *Cryptus leucopus*.

Male: Black. Facial orbit, usually a median dorsal spot on face, central part of clypeus, often part of cheek, lower 0.7± of frontal orbit narrowly, narrow orbital stripe at top of eye, much of hind orbit narrowly, part or most of mandible, much of front of segment 2 of maxillary palpus, sometimes a spot on base of tegula, sometimes a narrow stripe on subtegular ridge, under side of first trochanter of front leg and often also of middle leg, sometimes small apical ventral spot on front and middle coxae, and segments 2–4 of hind tarsus, white; palpi fuscous; front and middle femora and tibiae blackish brown to brownish fulvous; apex of segment 1 of hind tarsus often pale brown or white; segment 5 of hind tarsus pale brown; wings subhyaline; abdomen red beyond the first segment, the clasper usually infuscate apically.



Figures 91–93.—Localities: 91 (left), *Trachysphyrus relativus relativus;* 92 (center), *T. r. nitschei;* 93 (right), *T. r. punicus.*

Female: Black. Narrow orbital stripes on front, top, and hind side of eye, white; front femur and tibia brown to blackish brown; segments 2–4 of hind tarsus pale brown to dark brown; segment 5 of hind tarsus brown; wings fuscous; abdomen red beyond the first segment.

Specimens (79♂, 87♀): From Alberta (Waterton); Arizona (near Alpine, Flagstaff, north rim of Grand Canyon, Greer, Jerome, Kaibab National Forest, Oak Creek Canyon, Parker Creek and Pocket Creek in the Sierra Ancha, Prescott, San Francisco Mts., Wallapai [=Hualapai] Mts., Williams, and Workman Creek in the Sierra Ancha); British Columbia (Keremeos, Pavilion Lake, and Princeton Summit at 6,000 ft.); California (Blanco's Corral on White Mt. in Mono Co. at 10,000 ft. and Boca); Colorado (Alamosa, Berkeley, Boulder, Florissant, Golden, Los Pinos, Manitou, Moffat Co. at 6,000 to 7,000 ft., Rico, and Rifle); Montana (Gallatin National Forest at 7,800 ft. and Helena); Nevada (Angel Creek near Wells, Eureka, "Kyle Canyon in Charlton Mts.," and Pequop Summit and "White Cup Ranch" in Elko Co.); New Mexico (Cedro Canyon in Bernalillo Co., Cienega Canyon near Albuquerque, Jemez Springs, and Magdalena Mts.); Utah (Beaver Canyon, Buckskin Valley in Iron Co., Farmington, "Kent Lake in Beaver Creek Mts. at 8,000 ft.," Navajo Lake at 9,000 ft., South Creek in Beaver Co., and Uintah Co.); and Washington (Almota and Easton).

Collection dates are mostly from May 4 to July 29. Those outside of this range are: April 28 at Workman Creek, Sierra Ancha, Ariz.; May 2 at Parker Creek, Sierra Ancha, Ariz.; August 10 at Flagstaff, Ariz.; August 15 at Princeton Summit, 6,000 ft., B.C.; and August 19 and 21 at Robson, B.C.

There is one rearing record: 2♀, from *Aegeria tibialis*, Jemez Springs, N. Mex., June 25 and July 2, 1929, G. P. Engelhardt. A third female of this same rearing is colored like the subspecies *relativus*, so is classified there!

This subspecies is found mostly in the Great Basin and vicinity, but specimens of it occur sporadically also through most of the range of the subspecies *relativus*.

7c. Trachysphyrus relativus punicus (Cresson), new status

Cryptus punicus Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 364; ♀. Lectotype: ♀, California (Philadelphia).

Cryptus californicus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 411; ♀. Type: ♀, Placer Co., Calif. (Washington).

Male: Black. Wide facial orbit, narrow orbit on lower 0.7± of frons, short narrow orbital stripe at top of eye, part of hind orbit narrowly, often more or less of cheek, mediodorsal mark on face, clypeus, part or all of mandible, sometimes spot at base of tegula, sometimes subtegular ridge, under side of front first trochanter and sometimes also of middle first trochanter, sometimes apex of front and middle coxae, and segments 2–4 of hind tarsus, white or yellow; palpi fulvous to fuscous, often partly white; spot on front of scape ferruginous; tegula black to brownish fulvous; legs ferruginous, the coxae often partly blackish basally and above, hind tibia and basitarsus brown, and segment 5 of hind tarsus ferruginous or brown; basal 0.5± of segment 2 of hind tarsus often brown or ferruginous; wings subhyaline; abdomen ferruginous, the apex of clasper often infuscate.

Female: Ferruginous. Orbit narrowly yellow in front, at top, and behind; pedicel and flagellum blackish brown; apical margin of scape somewhat infuscate; palpi fuscous; subtegular ridge often with a fuscous tinge; under part of thorax and areas near scutellum sometimes more or less black; front and middle tarsi ferruginous brown to ferruginous; hind tibia and basitarsus reddish brown or sometimes ferruginous; segments 2–4 of hind tarsus usually ferruginous but sometimes yellowish; segment 5 of hind tarsus ferruginous; wings dark brown.

Specimens (67♂, 188♀): From British Columbia (Oliver and Penticton); California (Angora Peak at 8,625 ft., Atascadero, Bigpine and Bigpine Creek at 9,500 ft. in Inyo Co., Bishop Canyon in Inyo Co., Blue Lake in Lassen Co., Boca, Bridge Creek Camp in Lassen Co., Brockway, Buck's Lake in Plumas Co., Camp Baldy in Los Angeles Co., Cedar Pass in Modoc Co., Cisco, Convict Lake in Mono Co., Crane Flat in Yosemite Park, Dardanelle, Devil's Basin at 8,200 ft. in El Dorado Co., Doble in San Bernardino Co., Donner Pass, Echo Lake, Fish Camp, near Glacier Point in Yosemite Park, Hackamore in

Modoc Co., Hallelujah Junction in Lassen Co., Hat Creek in Shasta Co., Herkey Creek in the San Jacinto Mts., Hope Valley in Alpine Co., Idyllwild in the San Jacinto Mts., Independence Lake in Sierra Co., Lake City, Leavitt Meadow in Mono Co., Leevining, Lone Pine, Mammoth in Modoc Co., Meadow Valley in Plumas Co., at 4,000 to 5,000 ft., Meyers, Mineralking at 8,000 ft., Mojave Desert, Owens Valley in Inyo Co., 4 miles west of Quincy, Redwood Meadows in Tulare Co. at 6,000 ft., Sagehen near Hobart Mills, Samuel Spring in Napa Co., Sardine Creek in Mono Co. at 8,500 ft., Sequoia National Park at 7,000 to 9,000 ft., Sierraville and 5 miles south of Sierraville, Snowline Camp in El Dorado Co., Sonoma Co., Sonora Pass at 9,000 to 10,000 ft. and 9,624 ft., Summit in Placer Co., Summit Camp in Lassen Co., Tamarack Lake in El Dorado Co., Tanbark Flat in Los Angeles Co., Tioga Pass, Topaz, 7 miles southeast of Truckee, Twin Lakes in Mono Co., 2 miles north of Warner Springs, Webber Lake in Sierra Co., Winnemucca Lake in Alpine Co., and Yosemite Valley); Nevada (Minden); Oregon (Aspen Lake, Bly, Drake Peak in Lake Co. at 7,000 ft., Eagle Ridge at Klamath Lake, Fish Creek at 7,500 ft. and Fish Lake in the Steens Mts., 42 miles east of Klamath Falls, Lakeview, and Mary's Peak in Benton Co.); and Washington (Bogachiel Peak in Olympic National Park and Mount Rainier).

Collection dates are mostly from May 25 to August 1. Those outside of this range are: May 9 in the Mohave Desert, Calif.; May 13 and 21 at Samuel Spring, Napa Co., Calif.; May 20 at Minden, Nev.; May 21 and 24 at Lone Pine, Calif.; May 22 at Herkey Creek, San Jacinto Mountains, Calif.; August 2 in Owens Valley, Inyo Co., Calif.; August 3 at Redwood Meadows, 6,000 ft., Tulare Co., Calif.; and August 6 at Sonora Pass, 9,624 ft., Calif.

This subspecies occurs at higher altitudes from southern British Columbia to southern California.

8. Trachysphyrus pacificus (Cresson)

Figures 328,m; 375

Cryptus pacificus Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30' p. 361; ♂. Type: ♂, California (Philadelphia).

Front wing 7.5 to 13 mm. long. Structurally similar to *T. relativus* except as stated in the key and except that ovipositor tip is a very little heavier and the ridges on its lower valve a little more prominent.

Male: Colored as in male of *T. relativus punicus* except that white or yellow markings average a little more extensive, the tegula is ferruginous or fulvous (with or without a basal yellow spot), and segment 2 of hind tarsus is always yellow.

Female: Colored as in female of *T. relativus punicus* except that it does not develop the fuscous areas on thorax that are sometimes present in *punicus* and that segments 2 and 3 of hind tarsus are always yellowish.

Specimens (40♂, 114♀): From British Columbia (Anderson Lake at D'Arcy, Fish Lake near Summerland, and "Hope Summit"); California (Angora Peak near Lake Tahoe, Arroyo Seco Camp in Monterey Co., Big Dalton Dam in Los Angeles Co., Bridge Creek Camp in Lassen Co., Brockway, Buck's Lake in Plumas Co., Camp Baldy in Los Angeles Co., Carson Pass in Alpine Co. at 8,000 ft., Chile Bar in El Dorado Co., Coalinga, Colfax, Crystal Lake in Los Angeles Co., 10 miles south of Delta in Shasta Co., Devil's Basin at 8,200 ft. in El Dorado Co., Echo Lake, 9 miles west of Hat Creek P.O., Hope Valley in Alpine Co., 3 miles east of Lake Eiler in Shasta Co., Manzanita Lake in Lassen National Park, Mesa Grande in Sonoma Co., Mill Creek Road in San Bernardino Co., Mineralking, Mono Co. at 10,600 ft., Moose Camp in Shasta Co., Mount Baldy Trail in Los Angeles Co. at 5,000 to 6,000 ft., Mount Diablo in Contra Costa Co., Onion Valley in Plumas Co., Oro Grande, Pasadena, Pinnacles (west side) in San Benito Co., Pyramid Ranger Station in El Dorado Co., 4 miles west of Quincy, Samuel Spring in Napa Co., San Antonio Valley in Santa Clara Co., Santa Barbara, Shaver Lake in Fresno Co., Sierraville, Snowline Camp in El Dorado Co., Summit Camp in Lassen Co., Tallac Lake near Lake Tahoe, Tamarack Lake in El Dorado Co. at 7,700 ft., Tanbark Flat in Los Angeles Co., Trinity Co., and Tuolumne Meadow in Yosemite National Park at 8,600 ft.); Nevada (Daggett Pass in Douglas Co.); and Oregon (Ashland Mt. in Jackson Co., Corvallis, Ghost Ridge on Mount Hood, Griffin Creek in Jackson Co., Metolius River, and Union Creek in Jackson Co. at 3,100 to 3,500 ft.).

Most collection dates are from June 19 to August 1, and a scattered few collections in August. Those outside of this range are: May 14 at Oro Grande, Calif.; May 24 at Samuel Spring, Napa Co., Calif.; May 29 ten miles south of Delta, Shasta Co., Calif.; June 1 to 3 at Coalinga, Calif.; June 5 at Arroyo Seco Camp in Monterey Co., Calif.; June 8 at Tanbark Flat, Los Angeles Co., Calif.; June 13 in Onion Valley, Santa Clara Co., Calif.; September 1 at Carson Pass, 8,000 ft., Calif.; September 3 near Manzanita Lake, Lassen National Park, Calif.; and December 21 at Pasadena, Calif.

This species ranges from southern British Columbia to southern California. It occurs in the Canadian, Transition, and Upper Austral zones.

9. Trachysphyrus serraticaudus (Pratt)

FIGURES 328,n; 376

Cryptus serraticaudus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 594; ♂, ♀. Type: ♀, Siskiyou Pass, Jackson Co., Oreg., 4,500 ft. (Washington).

Front wing 9.5 to 13.5 mm. long; head rather wide; clypeus rather strongly convex; frons with a shallow depression dorsolaterad of each antennal socket; front tarsus of female about 1.2 as wide as its tibia, as in figure 376; ovipositor sheath longer than in other Nearctic species, about 0.82 as long as front wing; ovipositor weakly upcurved, its lower valve with strong sharp teeth that extend about 0.35 of the distance from its apex to base of ovipositor sheath, as in figure 328,n.

Male: Body and legs ferruginous, more or less of head and thorax black, but mesoscutum always mostly ferruginous; coxae more or less fuscous at base and above; hind trochanters more or less infuscate; hind tibia fuscous, ferruginous basally; segment 1 of hind tarsus mostly brown, fulvous apically; segments 2–4 of hind tarsus yellowish; segment 5 of hind tarsus fulvous; wings dark brown.

Female: Head, body, and legs fulvoferruginous, the thorax with some narrow sutural markings black, apex of hind tibia darkened, and segments 2–4 of hind tarsus light fulvous; wings dark brown.

Specimens (11♂, 15♀): From British Columbia (Keremeos, Nicola at 2,200 ft., and Vernon); California (Big Flat on Coffee Creek in Trinity Co., Coalinga and 12 miles west of Coalinga, Dutch Flat, Hastings Natural History Reservation in Santa Lucia Mts. near Jamesburg at 1,900 to 2,700 ft., Meadow Valley at 3,500 to 4,000 ft., and 4 miles west of Quincy); Colorado (Plainview at 7,000 to 8,000 ft.); Idaho (13 miles northeast of Franklin and Pine Spring in Minidoka [=Sawtooth] National Forest in Oneida Co.); Oregon (Jackson Co. near Copco [Calif.], Olene, and Siskiyou Pass in Jackson Co. at 4,500 ft.); Utah (Cache Junction and Park City); and Washington (Touchet).

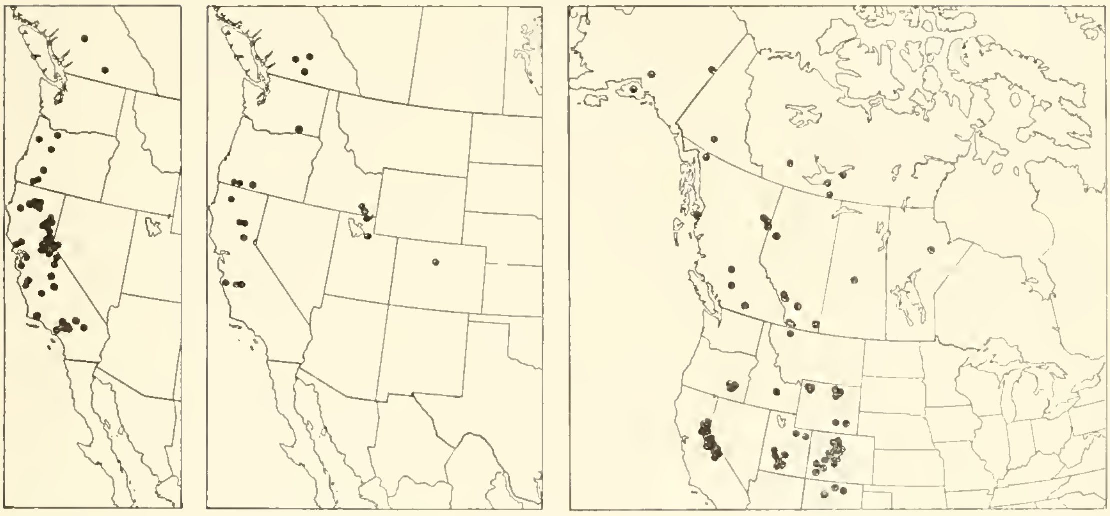
Collection dates are mostly from May 30 to July 7. Those outside of this range are: April 8 twelve miles west of Coalinga, Calif.; April 26 at Coalinga, Calif.; May 29 at Dutch Flat, Calif.; July 9 to 14 at Plainview, 7,000 to 8,000 ft., Colo.; and July 13 at Keremeos, B.C., and at 13 miles northeast of Franklin, Idaho.

This species ranges from southern British Columbia to central California, eastward to central Colorado. Most of the localities in which it has been collected are in the Upper Sonoran fauna.

10. Trachysphyrus calescens (Gravenhorst)

FIGURES 328,o; 377

Front wing 8.0 to 13.0 mm. long; head with long, suberect, brown hairs; cheek about 0.9 as long as basal width of mandible in male, about 1.25 as long in female; clypeus rather narrow, rather weakly



Figures 94–96.—Localities: 94 (left), *Trachysphyrus pacificus;* 95 (center), *T. serraticaudus;* 96 (right), *T. calescens robustus.*

convex; depression on frons dorsolaterad of antennal socket rather shallow; under side of hind femur with a subapical longitudinal ridge (weakly developed in male, rather strong in female); front tarsus of female a little expanded, about 1.1 as wide as front tibia, as in figure 377; ovipositor tip rather short, distinctly upcurved, as in figure 328,o.

This species is Holarctic. Though we have seen some Eurasian material in European museums, there is now before us only a single female from Germany, which is of course not enough for a general discussion of the Eurasian forms. The typical European form, at least in the female, has the abdomen black with the second and third tergites ferruginous, and the wings faintly infuscate. In American specimens the abdomen varies from entirely black to entirely ferruginous, if partly black and partly ferruginous it is black basally and ferruginous apically, not ferruginous in the middle and black at both ends as in the subspecies *calescens.* The wings of American specimens vary from weakly to strongly infuscate. These differences seem constant enough for the separation of the American populations as a subspecies, which is so treated below.

The European form should be called *Trachysphyrus calescens calescens* (Gravenhorst). It was described in 1829 (Opuscula ichneumonologia, vol. 2, p. 548). Its type is a female from the Piedmont of Italy, in the Gravenhorst collection in Wroclaw. Prof. Jan Noskiewicz was kind enough to compare specimens with the type for us.

10a. Trachysphyrus calescens robustus (Cresson), new status

Cryptus robustus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 298; ♀. Lectotype: ♀, Colorado (Philadelphia).

Cryptus crassicornis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 292; ♂. Lectotype: ♂, Colorado (Philadelphia).

Wings weakly to strongly infuscate, darker in female than in male; abdomen varying from entirely black to entirely ferruginous, if partly ferruginous and partly black the black is basal and the ferruginous is apical.

There is a cline in the degree of wing infuscation and another in the amount of black on the abdomen, which result in differences between extreme populations that are conspicuous and constant, but with so many intermediates that it seems impractical to distinguish subspecies on these characters. Part of the difficulty is that the abdominal color of males and females varies a little independently, and separation of color subspecies according to this character would result in different geographic limits according to whether the male or the female colors were emphasized. Populations from some borderline areas (as a series from Blanco's Corral, White Mt., Mono Co., Calif.) tend to have the male abdomen black and the female abdomen ferruginous. The intensity of wing infuscation increases gradually from north to south, or from areas of less sun to areas of more sun. The black on the abdomen decreases from east to west. Specimens from the Rocky Mountains, from Alaska to New Mexico, have the abdomen black except that in some females from Colorado and Wyoming it is partly or mostly ferruginous. Specimens from California and southern Oregon have the abdomen ferruginous, with the first segment often infuscate basally in the female and always entirely black in the male. A few females at hand from the Great Basin have the abdomen ferruginous with the first segment black and usually with some basal infuscation on the second tergite. A third cline, one that is relatively inconspicuous, is that the femora and tibiae grade from fulvous in specimens from the northern parts of the range to ferruginous in specimens from the central and southern parts of the range, most intensely ferruginous in those from California and southern Oregon.

Specimens (124♂, 172♀): From Alaska (Eagle, Kenai Peninsula, Ketchikan, and Matanuska); Alberta (Banff and near Banff on the Banff-Jasper Highway, Beaverlodge, Calgary, Cypress Hills, Waterton, and Waterton Lakes); British Columbia (Atlin, Blue Lake west of Lytton at 7,000 ft., Chilcotin, Fort St. John, Mount Apex near Hedley at 5,800 ft., Pouce Coupe, and Taylor); California (Angora Peak at 8,625 ft., 3 miles east of Bishop, Blanco's Corral on White Mt. in Mono Co. at 10,000 ft., Dardanelle, Donner Pass, Hope Valley in Alpine Co., Independence Lake in Sierra Co., Leavitt Meadow in Mono Co., Marie Lake in Fresno Co. at 10,500 ft., Mono Co. at 7,700 ft., Mono Lake, near Mono Pass in Inyo Co. at 12,000 ft., Mount Dana in Tuolumne Co., Mount Tallac near Lake Tahoe, Pioneer Basin in Fresno Co. at 10,000 to 11,000 ft., 1 mile north of

Piute Mt. in Mono Co., Sagehen near Hobart Mills, Sardine Creek in Mono Co., Snowflat in Yosemite Park, Sonora Pass at 8,500, 8,700, and 9,000 to 10,000 ft., near Sonora Peak in Tuolumne Co. at 11,000 ft., Tamarack Lake in El Dorado Co. at 7,700 ft., Tuolumne Meadows in Tuolumne Co., and Winnemucca Lake in Alpine Co.); Colorado (Baldy Mt. in Boulder Co. at 10,800 to 11,000 ft., Boulder, Colorado Springs, Creede at 8,844 ft., Dumont, Durango, Estes Park at 11,000 ft., Florissant, Longs Peak Inn at 9,000 ft., Phantom Valley in Rocky Mountain National Park at 9,400 ft., Platte Canyon, Poncha Springs, Silverton, Tennessee Pass at 10,240 ft., and Westcliffe); Idaho (Bear Pass Creek in Butte Co.); Manitoba (Gillam); Montana (Saint Mary); New Mexico ("Aqua Viva," Cimarron Canyon in Colfax Co., Jemez Springs, and Red River); Northwest Territories (Fort Resolution, Fort Simpson, Fort Smith, and Snowdrift); Oregon (head of Blitzen River at 7,000 ft., Fish Lake at 7,000 ft., above Fish Lake at 8,500 ft., and 3 miles south of Fish Lake at 7,500 ft., all in the Steens Mts.); Saskatchewan (St. Louis); Utah (Beaver Range Mts. at 8,000 to 10,000 ft., 10 miles north of Cedar Breaks National Monument at 10,500 ft., north fork of Duchesne River, Duck Lake on Navajo Mt. in Kane Co. at 9,000 ft., Fish Lake in Sevier Co. at 8,600 ft., Kent Lake in Beaver Canyon, Navajo Lake at 9,000 ft., and Uinta Co.); Wyoming (Big Horn Mts., Buffalo at 6,000 ft., Centennial, Laramie, and Lake Camp, Mount Washburn, and Old Faithful in Yellowstone Park, and Powder River Pass); and Yukon Territory (Whitehorse).

Collection dates are mostly from June 15 to August 2. Those outside of this range are: May 20 at Fort St. John, B. C.; May 29 at Nicola Lake, B. C.; June 5 and 14 at Atlin, B. C.; June 7 at Chilcotin, B. C.; June 10 at Fort Smith, N. W. T.; June 12 and 13 near Estes Park, Colo.; August 8 near Sonora Peak, 11,000 ft., Calif.; August 15 near Mono Pass, 12,000 ft., Inyo Co., Calif.; and August 30 at Marie Lake, 10,500 ft., Fresno Co., Calif.

The usual habitat is among scattered conifers in grassy areas, near timber line. Males commonly fly about small conifers.

This subspecies occurs in the Canadian and Hudsonian zones of western North America.

11. Trachysphyrus symmetricus (Pratt)

FIGURES 328,p; 380

Front wing 7.6 to 10.3 mm. long; clypeus very wide, moderately convex, in profile its apical half flattened; frons with a pitlike depression dorsolaterad of each antennal socket; temple unusually wide, rather flat, the punctures on its lower 0.7 moderately sparse in male (separated by about 2 times their diameter), very sparse in female (separated by about 3 times their diameter); occipital carina complete below but not strong; hypostomal carina not very high; mesoscutum and mesosternum of female very sparsely punctate; front tarsus of female very broadly expanded and with very long bristles, as in figure 380; ovipositor tip as in figure 328,p.

There is a Rocky Mountain and a Sierra Nevada subspecies, separable in the female as treated below. Only two males are known: one from Pullman, Washington, June 1921, Doyle Starcher (Pullman); and one from Blanco's Corral, 10,000 ft., White Mt., Mono Co., Calif., July 1953, N. Malley (Davis). The first male mentioned above we have not seen; it was described by Pratt in his original description of the subspecies *symmetricus.* This description indicates that the specimen is similar in coloration to the female of the subspecies *symmetricus.* The second specimen is before us. Though it is within the range of the subspecies *bilobatus* its color is quite different, being like the male of *T. relativus nitschei* but with the black more intense, wings a little infuscate, and basal 0.7 of segment 2 of hind tarsus fuscous. It may be that there are other males of the species among the specimens that have passed through the hands of Pratt and ourselves; if so they were mixed with males of *T. relativus.* We have been on the lookout for such masqueraders, but found only the single male from Blanco's Corral, described above. Since only two males are known and the characters of one of them do not correspond with either of the subspecies as illustrated by females, the subspecific treatment below is limited to the females.

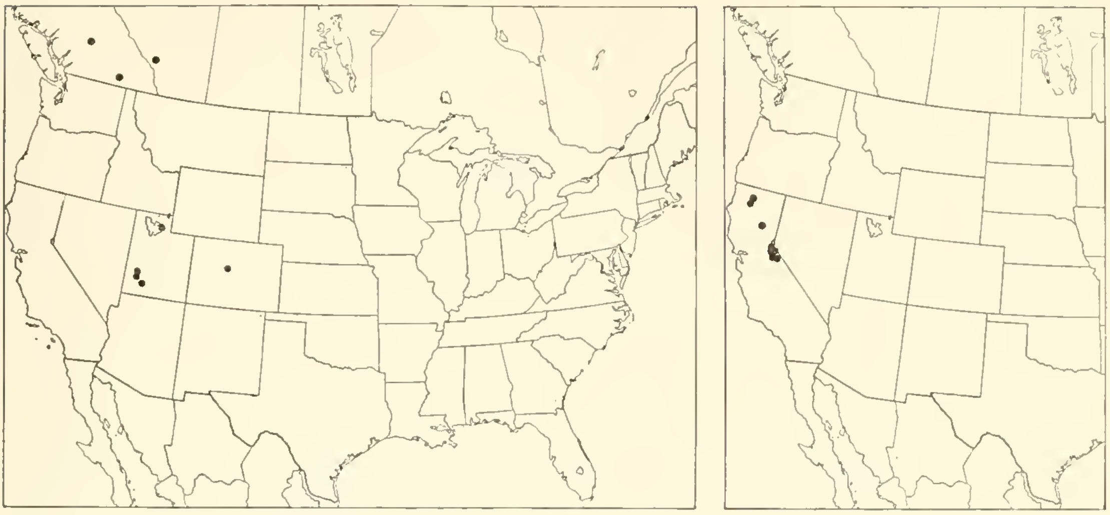
1. Coxae black; range: Rocky Mountain area.
11a. symmetricus symmetricus (Pratt)
Coxae red; range: Sierra Nevada . . . **11b. symmetricus bilobatus** (Pratt)

11a. Trachysphyrus symmetricus symmetricus (Pratt)

Cryptus symmetricus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 590; ♂, ♀. Type: ♀, Beaver Range Mts., Utah, 8,000 to 10,000 ft. (Washington).

Female: Black. Front and hind orbits narrowly white; femora, apical 0.3 ± of first abdominal segment, and all of following abdominal segments red; front and middle tibiae and tarsi ferruginous to fuscous; segment 1 of hind tarsus dark brown, its apex paler; segments 2–4 of hind tarsus dirty white to brown; segment 5 of hind tarsus light brown; wings blackish.

Specimens: ♀, Banff, Alta., July 1, 1925, Owen Bryant (Washington). ♀, Lillooet, B. C., May 27, 1925, E. R. Buckell (Ottawa). 2♀, Robson, B. C., July 5, 1947, and Oct. 22, 1948, H. R. Foxlee (Ottawa). ♀, Florissant, Colo., June 19, 1907, S. A. Rohwer (Cambridge). ♀, "Columbia Mt.," Mont., July 5, 1934, H. T. Rogers (Moscow). ♀, Farmington, Utah, June–July, 1944, G. S. Bohart (Townes). ♀, Na-



FIGURES 97, 98.—Localities: 97 (left), *Trachysphyrus symmetricus symmetricus;* 98 (right), *T. s. bilobatus.*

vajo Lake, 9,000 ft., Utah, June 17, 1940, R. M. Bohart (Davis). ♀, South Creek, Beaver Co., Utah (Washington). ♀, "Strawberry Valley," Utah, July 22, 1934, E. W. Anthon (Washington).

This subspecies occurs in the Rocky Mountains, from southern Alberta and British Columbia to Colorado and Utah.

11b. Trachysphyrus symmetricus bilobatus (Pratt), new status

Cryptus bilobatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 592; ♀. Type: ♀, Carrville, Trinity Co., Calif., 2,400 to 2,500 ft. (San Francisco). Type not seen.

Female: Black. Front and hind orbits narrowly whitish; often mandible and clypeus ferruginous; scape ferruginous, its apical margin infuscate; flagellum fuscous, with a reddish tinge; tegula ferruginous to black; coxae, trochanters, femora, and abdomen red; tibiae and tarsi red or dusky red, the hind tibia and tarsus darkest; wings blackish.

Specimens: ♀, Angora Peak at 8,625 ft., Calif., July 19, 1931, E. O. Essig (Berkeley). ♀, Buck's Lake, Plumas Co., Calif., July 1, 1949, R. G. Howell (Berkeley). ♀, Carrville, 2,400 to 2,500 ft., Trinity Co., Calif., June 17, 1934 (Townes). ♀, Dardanelle, Calif., July 3, 1948, H., M., G., D., and J. Townes (Townes). 2♀, Hope Valley, Alpine Co., Calif., July 9 and 18, 1948, J. W. MacSwain (Berkeley). ♀, Sonora Pass at 9,000 to 10,000 ft., Mono Co., Calif., July 11, 1957, John M. Burns (Berkeley). ♀, Trinity Co., 5,504 ft., Calif., June 12, 1934, T. G. H. Aitken (Townes). ♀, Winnemucca Lake, Alpine Co., Calif., July 17, 1949, R. M. Bohart (Davis).

This subspecies occurs in the Sierra Nevada, in the Canadian and Hudsonian zones.

12. Trachysphyrus asymmetricus (Pratt)

FIGURES 329,a; 381

Front wing 6.0 to 11.0 mm. long; clypeus broad, moderately convex; frons with a weak depression or pit dorsolaterad of each antennal socket; temple rather broad and full; lower end of occipital carina usually incomplete and not reaching hypostomal carina; punctures on lower 0.7 of temple of female, and on mesoscutum and mesosternum of female moderately large and very sparse; mesopleurum and metapleurum with horizontal or oblique wrinkling, in the male the wrinkling weak and interspersed with or partly replaced by punctures; front tarsus of female as in figure 381; ovipositor sheath about 0.33 as long as front wing; ovipositor tip as in figure 329,a.

There are two subspecies, separable on color as below:

1. Mesoscutum entirely black; front and hind orbits with narrow whitish marks; range: Sierra Nevada to Rocky Mountains. **12a. asymmetricus asymmetricus** (Pratt)

Mesoscutum and front and hind orbits of female largely or entirely red; range: San Bernardino and San Diego Counties, California. **12b. asymmetricus mirabilis** (Pratt)

12a. Trachysphyrus asymmetricus asymmetricus (Pratt)

Cryptus asymmetricus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 587; ♂, ♀. Type: ♀, French Glen, Steens Mts., Oreg. (Washington).

Male: Black. Facial orbit, lower 0.6± of frontal orbit narrowly, part of hind orbit narrowly, central part of clypeus, median part of mandible, and sometimes dorsocentral spot on face, white; front of second segment of maxillary palpus partly whitish; femora varying from black to fulvous; front and middle tibiae varying from fuscous to fulvous; hind tibia varying from black to fuscofulvous; front and middle tarsi fulvous or somewhat infuscate; segments 1 and 2 of hind tarsus fuscous, the second segment often partly light brown; segments 3 and 4 of hind tarsus white or fulvous, and segment 5 pale brown to fuscous; wings subhyaline to moderately infuscate; first abdominal segment black, its apical 0.3± usually red; abdomen red beyond the first segment.

Female: Black. Front and hind orbits narrowly stramineous; front and middle legs beyond trochanters and hind femur varying from ferruginous to black; wings black; apical 0.33± of first segment of abdomen and all of the following segments, red.

Specimens (47♂, 88♀): From Alberta (Blackfoot Hills, Calgary, Consort, Cypress Hills, and Waterton); Arizona (Grand Canyon at 7,000 ft. and 20 miles south of Jacob Lake in Coconimo Co.); British Columbia (Aspen Grove, Chilcotin, Clinton, Douglas Lake, Fort Steele, Kamloops, Keremeos, Lillooet, Midday Valley, Mount Lolo near Kamloops, Nicola, Okanagan, Oliver, Osoyoos, Vaseaux Lake 12 miles south of Penticton, and Vernon); California (Blanco's Corral on White Mt. in Mono Co. at 10,000 ft., Doyle, Leavitt Meadow in Mono Co., Sagehen near Hobart Mills, and Spaldings in Lassen Co.); Colorado (Castle Park in Dinosaur National Monument, Cripple Creek, Florissant, east of Lake George, and Moffat Co. at 6,000 to 7,000 ft.); Idaho (7 miles northwest of Aberdeen, 5 miles north of Bliss, 3 miles south of Gooding, Hot Springs 9 miles north of Mountain Home, Malad, 3 miles northwest of Malta, St. Maries, Shoshone, and 18 miles south of Twin Falls at 3,700 ft.); Montana (Helena and Missoula); Nevada (Eureka, and Lamoille Canyon in Ruby Mts., Pequop Summit, and Secret Pass in Ruby Mts. at 6,500 ft., all in Elko Co.); Oregon ("Cody Ranch" in Harney Co., Fish Lake and French Glen at 4,300 ft. in Steens Mts., Tollgate, and Virginia Valley near Follyfarm in Steens Mts.); Saskatchewan (Great Deer, Saskatchewan Landing, and Saskatoon); Utah (Beaver Canyon, Beaver Valley, Blue Creek, Bryce Canyon, Fort Duchesne, Jordan Narrows, Logan Canyon, Magna, Provo, and St. George); Washington (Grand Coulee, Pullman, Wenatchee, and Yakima Co.); and Wyoming (Laramie).

Collection dates are mostly from May 10 to July 20. Those outside of this range are: April 30 at Grand Coulee, Wash.; May 1 at Yakima, Wash.; May 4 at Wenatchee, Wash.; May 9 three miles south of Gooding, Idaho, and in Yakima Co., Wash.; July 27 at Cripple Creek, Colo.; and August 7 in the Blackfoot Hills, Alta.

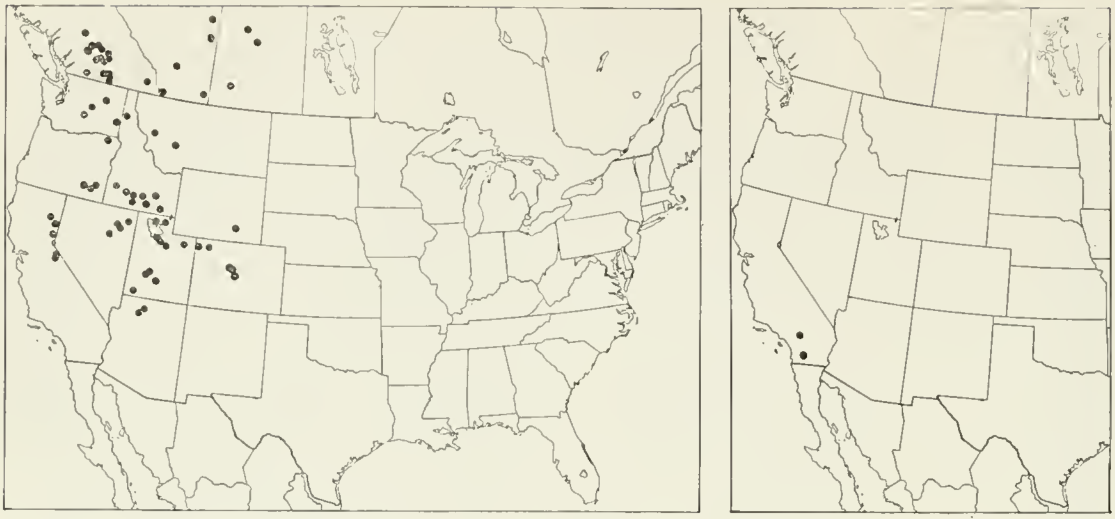
This subspecies occurs in western North America from Saskatchewan and British Columbia southward in the Rocky Mountain area to northern Arizona, and also in the higher parts of the Sierra Nevada of California. We ourselves have never taken it, but judging from the locality data it seems to be generally distributed in the Canadian zone.

12b. Trachysphyrus asymmetricus mirabilis (Pratt), new status

Cryptus mirabilis Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 589; ♀. Type: ♀, Crestline, San Bernardino Co., Calif. (Washington).

Male: Black. Face except for a sublateral fuscous stripe, mouth parts, narrow stripe on hind orbit, and front of scape, yellow; scutellum, most of mesoscutum, tegula, subtegular ridge, hind corner of pronotum, and small spot on lower part of mesopleurum, red; legs and abdomen red, the hind tibia and tarsus a little infuscate, segments 3–4 of hind tarsus and apical half of segment 2, yellow; wings moderately infuscate.

Female: Black. Head largely or almost entirely, mouth parts, scape, pedicel, base of flagellum, much to nearly all of mesoscutum,



Figures 99, 100.—Localities: 99 (left), *Trachysphyrus asymmetricus asymmetricus;* 100 (right), *T. a. mirabilis.*

scutellum, tegula, subtegular ridge, hind corner of pronotum, more or less of edges of pronotum, more or less of propleurum and mesosternum, mark on lower part of mesopleurum, legs, and abdomen, red, the hind tibia and tarsus somewhat infuscate; wings fuscous.

Specimens: ♂, 7♀, Culp Canyon, Anza State Park, San Diego Co., Calif., Apr. 4, 1959, J. C. Hall and E. I. Schlinger (Davis and Townes).

III. LABORATOR GROUP

Hairs on head, thorax, and coxae short to moderately long; temple smooth, with distinct punctures; frons strongly concave, with a pit dorsolaterad of each antennal socket; epomia usually of moderate length; basal carina of propodeum usually weak or absent (strong in the European *T. divisorius*); front tarsus of female not widened; areolet pentagonal, its front side short and its mesal side usually a little longer than its outer side; second recurrent vein simply arched, usually rather short; axillus vein weakly convergent to inner hind margin of hind wing.

This group is Holarctic. It contains the five Nearctic species treated below (one of which is Holarctic), the Palearctic *Cryptus divisorius* Tschek 1872, *Buathra rufiventris* Cameron 1903, *Bathycrisis striaticollis* Cameron 1903, and several undescribed species from Asia. *Trachysphyrus divisorius* (Tschek) is a new combination.

Although the group is usually easy to recognize, the only reliable distinction between it and the Albitarsis group is the presence of pits on the frons, and the distinctness of the pits is variable. It appears that the character of the presence of pits and the grouping that results from emphasizing it is only partially natural. Most species of the

Calescens group also have pits on the frons, but in these the axillus vein is divergent from the wing margin, rather than convergent.

13. Trachysphyrus laborator (Thunberg)

Front wing 6.0 to 12.5 mm. long; body rather slender; lower half of frons with rather fine wrinkling, in the female the wrinkling usually with a vertical bias; pits on frons moderately deep; first segment of female flagellum about 8 times as long as wide; temple weakly to rather strongly convex; mesopleurum with dense reticulate wrinkling which appears to have resulted from the crowding of punctures; hind femur of male about 6.0 as long as deep, of female about 5.8 as long as deep.

There are five subspecies, differing mostly in color and in the male clasper as keyed and described below:

1. Coxae fulvous; range: most of Washington, Oregon, and California and part of Idaho, and Southern British Columbia . **13d. laborator perplexus** (Cresson)
   Coxae black 2
2. Hind femur fuscous; range: Korea. . . **13b. laborator satoi,** new subspecies
   Hind femur fulvous 3
3. Temple about 1.0 as long as eye; sculpture of pleura and propodeum very fine and dense; range: Greenland . . . . . **13e. laborator fabricii** (Schiødte)
   Temple about 0.75 to 0.95 as long as eye; sculpture of pleura and propodeum moderately fine and dense 4
4. Apex of male clasper rounded; upper edge of male clasper without a ridgelike thickening; range: Europe . . . . . **13a. laborator laborator** (Thunberg)
   Apex of male clasper obliquely truncate; upper edge of male clasper with a polished thickened ridge on its outer side; range: northern North America except Greenland and the Pacific Coast area. **13c. laborator altonii** (Dalla Torre)

13a. Trachysphyrus laborator laborator (Thunberg)

Ichneumon laborator Thunberg, 1822, Mém. Acad. Imp. Sci. St. Pétersbourg, vol. 8, p. 273; 1824, vol. 9, p. 344; [♂]. Type: ♂, Sweden (Uppsala). Type not seen.

Similar to the Nearctic subspecies *altonii* except that the temple averages a little more convex, clypeus lacks the central yellow area, hind tibia and tarsus are a trifle darker with the hind tarsus less extensively pale in the middle, wings are subhyaline in both sexes, apex of male clasper is rather narrow and obliquely rounded, and dorsal edge of clasper is without a distinct ridge on the upper side.

Specimens: 15♂, 18♀, from Sweden, Netherlands, Germany, and Italy.

13b. Trachysphyrus laborator satoi, new subspecies

Male: Unknown.

Female type: Front wing 12.5 mm. long. Structure as in the subspecies *laborator* and *altonii*.

Black. Front and middle femora brown, blackish brown basally, medium brown apically; hind femur blackish, its apex brown; tibiae and tarsi medium brown, segments 2–4 of hind tarsus pale brown; wings weakly infuscate.

Type: ♀, Sharei, Korea, July 19, 1931, K. Sato (Washington, USNM 63777).

13c. Trachysphyrus laborator altonii (Dalla Torre), new status

Cryptus proximus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 290; ♀. Name preoccupied by Fonscolombe, 1850. Type: ♀, Colorado (Philadelphia).

Cryptus altonii Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 560. New name.

Temple weakly to moderately convex, about 0.75 to 0.95 as long as eye; sculpture of pleura and propodeum moderately fine and dense; apex of male clasper with a broad oblique truncation, its lower apical corner distinctly accentuated, somewhat nipplelike; upper edge of male clasper with a polished, submarginal, rounded ridge.

Male: Black. Facial orbit, often central part of clypeus, mandible except its base and apex, sometimes base of tegula, stripe on under side of front first trochanter, and often apical spot on front coxa, yellow; maxillary palpus brown, its second segment more or less yellow; legs beyond trochanters fulvous, the hind tibia usually a little darkened and the hind tarsus usually yellow with the basal 0.7± of the first segment and all or most of the last segment dark fulvous; wings subhyaline.

Female: Black. Orbit narrowly whitish in front and behind; legs beyond trochanters fulvous, the hind tibia and tarsus a little darker fulvous than the rest; wings lightly to moderately infuscate.

The male clasper of this subspecies (and of *perplexus*) is usually quite distinct from those of the subspecies *laborator* and *fabricii*, but is variable. In some specimens it approaches the shape of the clasper of one or the other subspecies, and occasionally it is not really different.

Specimens (301♂, 404♀): From Alaska (Anchorage, Big Delta, Eagle, Fort Yukon, King Salmon on Naknek River, Matanuska, Mount McKinley at 2,500 ft., Naknek, Nome, Palmer, 10 miles west of Portage on Kenai Peninsula, and Skagway); Alberta (Athabasca, Banff, Mile 14 on Banff-Jasper Highway, Banff National Park, Bilby, Cascade Mt., Shale Ridge near Banff at 7,500 to 8,600 ft., Chin, Cowley, Crows Nest Pass, Cypress Hills, Drumheller, Edmonton, Glenwood, Grimshaw, High River, Jasper, Laggan, Lake Louise, Lethbridge, McMurray, Onefour, St. Paul, Wabamun, Waterton, and Welling); Arizona (near Alpine, Greer, "Haith Spring," San Francisco Mts. near Flagstaff at 9,400 ft., and Springerville at 9,200 ft.); British Columbia (Atlin, "Bear Lake," Beaver Mouth in the Selkirk Mts., Canim Lake, Carbonate on the Columbia River at 2,600 ft., Chilcotin, Clinton, Cranbrook, Creston, Departure Bay, Jesmond, Keremeos, Lillooet, Lower Post, Mount Lolo near Kamloops, Newgate, Oliver, 100 Mile House, Prince Rupert, Revelstoke, Robson, Royal Oak, Taylor, Terrace, Vancouver, Vavenby, Victoria, and Wellington); California (Angora Peak at 8,625 ft., Boca, Bridge Creek Camp in Lassen Co., Carrville in Trinity Co. at 2,400 to 2,500 ft., Dardanelle, Devil's Basin at 8,200 ft., Double Meadow in Fresno Co. at 8,000 ft., Fish Camp, near Glacier Point in Yosemite National Park, Gold Lake in Sierra Co., Glen Alpine Creek near Lake Tahoe, Hallelujah Junction in Lassen Co., Hope Valley in Alpine Co., Inyo Co. at 9,100 ft., Lassen Park in Shasta Co. at 7,500 ft., Leevining, Marie Lake in Fresno Co. at 10,500 ft., May Lake in Yosemite National Park at 10,500 ft., Mono Co. at 9,700 ft., Mount Tallac near Lake Tahoe, 4 miles west of Quincy, Sardine Creek in Mono Co., 4 miles north of Silver Lake in Amador Co., Sisson, Snow Flat in Yosemite Park at 8,700 ft., near Sonora Pass at 8,000 ft., Summit Camp in Lassen Co., Tallac Lake near Tahoe, Tioga Pass, and Tuolumne Meadows in Tuolumne Co.); Colorado (Ajax Mt. near Aspen at 11,300 ft., Baldy Mt. in Boulder Co. at 10,800 to 11,000 ft., Boulder, Boulder Canyon, Colorado Springs, "Colorado-Wyoming Line," Copeland Park in Boulder Co., Denver, near Estes Park, Fall River in Rocky Mountain National Park at 8,600 ft., Florissant, Fort Collins, Glen Haven, Grand Lake, Idaho Springs, Lyons, Manitou Park, Marshall Pass at 10,856 ft., Mill Creek in Rocky Mountain National Park at 8,000 ft., Moffat Co. at 6,000 to 7,000 ft., Monte Vista, Nederland, Peaceful Valley, Phantom Valley in Rocky Mountain National Park at 9,400 ft., Pingree Park, Poudre Lake in Rocky Mountain National Park at 11,000 ft., Rabbit Ears Pass at 9,500 ft., Silverton, South Park, Steamboat Springs, Tolland at 9,000 to 12,000 ft., and Trinidad); Idaho (Almo, Basin in Cassia Co., Bear Creek Camp 10 miles north of Leslie, Bear Pass Creek in Butte Co., Elba-Basin Pass in Cassia Co., Lake Waha, Lemhi Pass, Lewiston at 580 ft., Mount Moscow, Oakley at 4,542 ft., Priest Lake, Sandpoint at 2,086 ft., Tensed, Wallace, and Warren); Labrador (Goose Bay and "Tab. Is."); Maine (Bar Harbor and Limington); Manitoba (Bird's Hill, Gillam, Norway, and Teulon); Michigan (Alger Co., Douglas Lake, Hendricks Quarry, Isle Royale, and Yellow Dog Plains in Marquette Co.); Minnesota (Basswood Lake in Lake Co.): Montana (Hamilton, Madison River in Gallatin National Forest, Missoula, and Rock Creek and Madison River in Gallatin National Forest); Nevada (Lamoille Canyon in the Ruby Mts.); Newfoundland (St. Johns); New Hampshire (Bretton

Woods); New Mexico (Belen, Beulah, Cimarron Canyon in Colfax Co., Jemez Springs, top of "Las Vegas Range" at 11,000 ft., Manzano, Pecos on Pecos River, Red River, Rio Ruidoso in the White Mts., top of ridge between Sapello and Pecos Rivers at 11,000 ft., Taos, and Therma [=Eagle Nest] in Colfax Co.); New York (Ausable Chasm to Woods Falls, Cranberry Lake, Keene Valley, Newcomb, and New Russia); North Dakota (Medora); Northwest Territories (Fort Norman, Fort Simpson, Norman Wells, and Reindeer Depot); Nova Scotia (Kentville, and Robinson's Cabin at Coldbrook); Ontario (Coniston, Golden Lake, Hymers, Marshall's Bay at Arnprior, Ottawa, Sudbury, and Waubamick); Oregon (head of Blitzen River in Steens Mts. at 7,000 ft., Corvallis, Dixie Mt. in the Blue Mts. at 5,280 to 6,000 ft., Dixie Pass, Forest Camp in Grant Co., Fish Lake in the Steens Mts., Fort Klamath, Lake Wallowa State Park, Meacham, Todd Lake in Deschutes Co., and Union); Prince Edward Island (Brackley Beach and Dalvay House in Canadian National Park); Quebec (Burbridge, Fort Chimo, Great Whale River, Kazabazua, Indian House Lake, Lac Ste. Marie, Messines, Queen's Park in Aylmer, and Rupert House); Saskatchewan (10 miles west of Moose Jaw, Regina, Saskatoon, Waskesiu, and Willow Bunch); South Dakota (Black Hills); Utah (Beaver, Beaver Range Mts. at 8,000 to 10,000 ft., Fish Lake in Sevier Co. at 8,600 ft., Logan, Logan Canyon 5 miles east of Logan, Mantua, Navajo Lake in Kane Co. at 9,000 ft., 10 miles north of Orderville at 5,500 ft., Strawberry Daniel Pass, and Vernal); Washington (Ashford, Bellingham, Blue Mts., Friday Harbor, Kamiac Butte near Pullman, Mount Rainier at 5,300 and 5,700 ft., Pullman, Seattle, Spangle, and Spokane); Wisconsin (Green Bay); Wyoming (Centennial, Green River Lake, Grand Teton National Park, Lake Camp in Yellowstone National Park, Laramie, "Livingston," Mammoth Hot Spring in Yellowstone National Park, Shoshone Canyon at 6,500 ft., and Squaw Lake in Yellowstone National Park); and Yukon Territory (Duke River Meadow 5 miles north of Burwash Landing, Fort Selkirk, Rampart House, and Whitehorse).

Collection dates are mostly from late May to early September, with the peak of abundance from early June to early August. The earliest and latest records are: April 23 at Lewiston, Idaho; May 16 at Carrville, Trinty Co., Calif.; May 18 at Missoula, Mont.; May 19 at Robson, B.C.; September 11 at Vavenby, B.C. and at Robson, B.C.; September 15 at Corvallis, Oreg.; September 18 at Matanuska, Alaska; and October 1 at Robson, B.C.

There is one reared specimen: ♀, from pupa of *Melanolophia imitata*, Tensed, Idaho, June 8, 1954, Denton. The typical habitat is sedgy and shrubby northern bogs and meadows with scattered conifers.

This subspecies is transcontinental in the Canadian and Hudsonian zones, except where it is replaced by the subspecies *perplexus* in the Pacific States.

13d. Trachysphyrus laborator perplexus (Cresson), new status

Cryptus proximus var. *perplexus* Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 359; ♀. Type: ♀, California (Philadelphia).

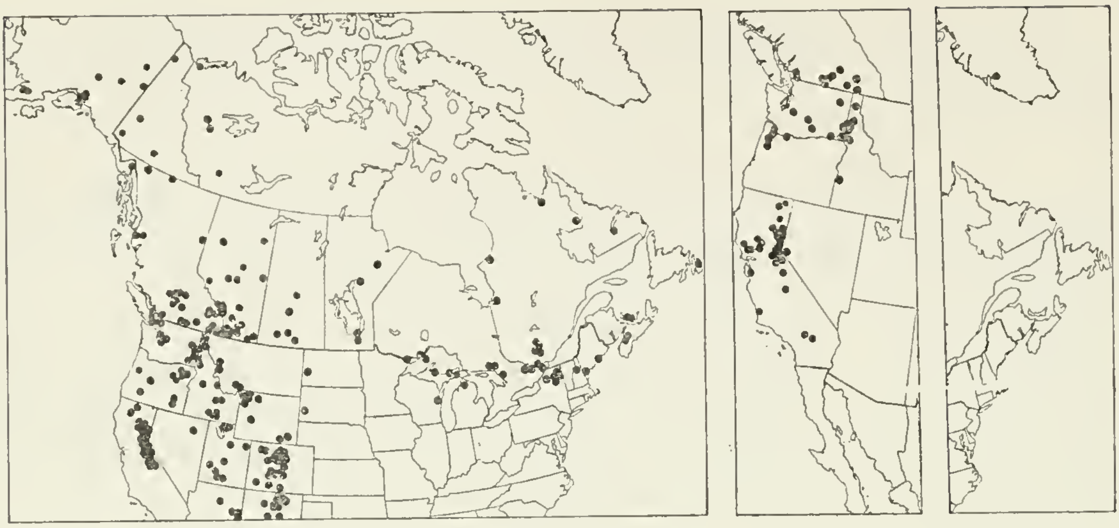
Structure as in the subspecies *altonii.*

Male: Black. Facial orbit broadly, frontal orbit narrowly, small spot at top of eye, usually hind orbit narrowly, center of clypeus, mandible, often extreme hind corner of pronotum, more or less of tegula, subtegular ridge, under side of front first trochanter, usually a spot on apex of front coxa, and sometimes stripe on under side of middle first trochanter, yellowish white; palpi brown, yellowish basally; legs fulvous, the hind tibia and tarsus brownish fulvous with the tarsal segments 2–4 and usually apex of segment 1 and base of segment 5 whitish; wings subhyaline. Sometimes the yellowish markings are a little more extensive than described.

Female: Black. Narrow front and hind orbits, sometimes center of clypeus, usually more or less of mandible, and subtegular ridge, yellowish; scape fulvous; palpi brownish; legs fulvous, the hind tibia and tarsus a little darker, the hind tarsus usually a little paler medially; wings moderately infuscate.

Intergrades between this subspecies and *altonii* are moderately common where the ranges of the two are adjacent or overlap. Most of the intergrading specimens are males. These have the coxae fulvous, with more or less extensive fuscous areas. Female intergrades have the coxae of a rather uniform color intermediate between black and fulvous.

Specimens (106♂, 86♀): From British Columbia (Agassiz, Creston, Cultus Lake, Kaslo, Keremeos, Oliver, Peachland, Robson, Summerland, and Vernon); California (Big Bear, Boca, Bridge Creek Camp in Lassen Co., Buck's Lake in Plumas Co., Camino, Carnelian Bay on Lake Tahoe, Crane Flat in Yosemite National Park, Dardanelle, Davis, Dollar Lake Trail in San Bernardino Co., Echo, Elkhorn Ferry in Yolo Co., Giant Forest in Sequoia National Park at 6,000 to 7,000 ft., Goose Lake in Modoc Co., Hope Valley in Alpine Co., Lake Forest on Lake Tahoe, Leland Meadow in Tuolumne Co., Mammoth, Oceano, Rio Linda, Sacramento, Sagehen near Hobart Mills, San Jose, San Jose State College, Sierraville, Susan River Camp in Lassen Co., Tallac on Lake Tahoe, Tamarack Lake in El Dorado Co. at 7,700 ft., Winnemucca Lake in Alpine Co., Winters, and Yuba Pass in Sierra Co.); Idaho (Juliaetta, Lewiston at 550 ft., Medimont, Moscow at 2,560 ft., Parma at 2,231 ft., Sandpoint at 2,066 ft., Sweetwater, Troy,



FIGURES 101–103.—Localities: 101 (left), *Trachysphyrus laborator altonii;* 102 (center), *T. l. perplexus;* 103 (right), *T. l. fabricii.*

and Viola); Nevada (Minden); Oregon (Benson State Park, "Briggs Creek," Corvallis, Forest Grove, Rickreall, and St. Helen's); Washington (Almota, Asotin, Colville, Mount Rainier at 5,300 ft., Pullman, Toppenish, Walla Walla, and Yakima).

Collection dates are mostly from May 1 to October 10. Those outside of this range are: April 6 at Davis, Calif., and at Winters, Calif.; April 23 at Sacramento, Calif.; April 24 at Oceano, Calif.; April 26 at Corvallis, Oreg.; October 14 and 25 at Davis, Calif.; October 15 at Moscow, Idaho, and at Summerland, B.C.; October 18 at Cultus Lake, B.C.; October 23 and November 3 at Pullman, Wash.; October 27 at Toppenish Lake, Wash.; and November 27 at Corvallis, Oreg.

This subspecies ranges from southern British Columbia to southern California, including western Idaho. It intergrades with the subspecies *altonii* rather freely in western Idaho and near the crest of the Sierra Nevada.

13c. Trachysphyrus laborator fabricii (Schiødte)

Cryptus Fabricii Schiødte, 1857, *in* Rink, Grønland geographisk og statistisk beskrevet, vol. II, pt. 3, p. 62; ♂, ♀. Types: ♂, ♀, Greenland (Copenhagen).

Body form a little stouter than in the other subspecies; sculpture of head and thorax distinctly finer and more mat than in the other subspecies; temple rather strongly convex, about 1.0 as long as eye; dorsal face of propodeum averaging shorter than in the other subspecies; hind tarsus averaging a little shorter than in the other subspecies.

Black. Male with facial orbit and mandible except at base and apex, yellow; legs beyond trochanters fulvous, the hind tarsus not yellowish medially; wings faintly infuscate.

This subspecies is structurally the most distinct of the five, but the few specimens of the subspecies *altonii* available from Labrador are rather close to *fabricii*. Possibly larger collections would show that *fabricii* should not be considered as restricted to Greenland.

Specimens: 16♂, 15♀, Sondrestrom Air Base, Greenland, June 11, 14, 16, 18, and 23, 1952, W. J. Brown (Townes). ♂, ♀, Greenland (Townes).

14. Trachysphyrus dorsicarinatus (Pratt)

Cryptus dorsicarinatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 613; ♂, ♀. Type: ♀, Vancouver, B.C. (Washington).

Front wing 5.2 to 8.0 mm. long; body moderately slender; lower half of frons polished, without wrinkles, its pits large and deep; first segment of female flagellum about 5.5 as long as wide; mesopleurum polished, with moderately small, sharp punctures, medially wrinkled or rugoso-punctate, the wrinkling irregular, not longitudinal; hind femur of male about 5.0 as long as deep, of female about 4.5 as long as deep.

Male: Black. Wide facial orbit, narrow frontal orbit, narrow stripe on hind orbit, thick V-shaped mark on center of face, more or less of clypeus, front of scape, mandible, subtegular ridge, usually more or less of tegula, usually extreme hind corner of pronotum, sometimes short stripe on lower anterior edge of pronotum, and sometimes spot on propleurum, white; palpi whitish or light brown; front and middle coxae white below; front and middle trochanters white below, their first trochanters fuscous above and their second trochanters either fuscous or fulvous above; front and middle legs beyond trochanters fulvous, their femora sometimes brown basally and their fifth tarsal segment brown; hind trochanters with ferruginous stains; hind femur ferruginous; hind tibia brown with ferruginous stains, darkest apically; segments 1 and 5 of hind tarsus brown, the first segment whitish apically and the fifth segment usually white at base; segments 2–4 of hind tarsus white; wings with a weak brown tinge; apical 0.05 to 0.3 of first abdominal segment ferruginous; segments 2–6 ferruginous; segment 7 ferruginous with its apical part infuscate; clasper black.

Female: Black. Front and hind orbit narrowly whitish; palpi fuscous; trochanters usually stained with ferruginous apically; femora and tibiae ferruginous, the hind tibia a little infuscate; tarsi brownish; wings moderately infuscate; abdomen ferruginous, the basal half of its first segment and its extreme apex infuscate.

Specimens (143♂, 58♀): From Alaska (Seward at 300 to 1,000 ft.); Alberta (Cochrane and Jasper); Arizona (Oak Creek Canyon); British Columbia (Adams Lake, Clinton, Floe Lake in Kootenay National Park at 6,500 ft., Ground Hog Basin to Downie Creek in the Selkirk Mts., Hedley, 15 miles southeast of Hope on the Fraser River, Keremeos, Kokanee Mt. at 9,000 ft., Lorna, Revelstoke, Robson, Rogers Pass, Vernon, Victoria, and Wellington); California (Camino, Dardanelle, and Glen Alpine Creek at Lake Tahoe); Colorado (Phantom Valley in Rocky Mountain National Park at 9,400 ft.); Idaho (13 miles northeast of Franklin and Lake Waha); Montana (Lake McDonald in Glacier National Park); Oregon (Portland); Utah (Kanosh Canyon, Navajo Lake at 9,000 ft., and Salt Lake City); and Washington (Mount Spokane and Summerland Trail in Mount Rainier National Park).

Collection dates are distributed from May 13 to August 21. We have found the species common among grass in stream bottoms, where there are deciduous trees.

This species ranges from southern Alberta and British Columbia to Arizona, in the Canadian and Transition zones.

15. Trachysphyrus lochmaius, new species

Front wing 7.7 to 8.5 mm. long; body stout; lower half of frons transversely wrinkled, its pits shallow; temple weakly convex; first flagellar segment of female about 4.0 as long as wide; mesopleurum polished, in male mostly punctate but rugulose centrally, in female mostly wrinkled and with more or less distinct punctures, the rugulosity or wrinkling with a horizontal bias in male, strongly horizontal in female; hind femur of male about 6.0 as long as deep, of female about 4.1 as long as deep.

Male: Black. Face except for a stripe on each side of middle and the median dorsal depression, narrow frontal orbit, narrow stripe on hind orbit, clypeus, mandible, front of scape, subtegular ridge, extreme hind corner of pronotum, and sometimes a narrow stripe on upper margin of pronotum, yellow; palpi yellow to fulvous, brown basally; front and middle coxae and first trochanters dark brown to black, yellowish white ventrally; front and middle second trochanters whitish below, fulvous above; front and middle femora, tibiae, and tarsi fulvous brown, the femora and tibiae pale in front and segment 5 of tarsi dark brown; hind tarsus yellowish white, the basal 0.35± of first segment and all but base of last segment brownish fulvous; wings with a brownish tinge; first segment of abdomen black, its apex usually more or less red; second segment of abdomen red, often infuscate medially; third and following segments of abdomen red.

Female: Black. Front and hind orbit narrowly yellowish; mandible tinged with red; palpi fuscous; front and middle legs beyond trochanters reddish brown; hind femur red, its apex a little infuscate; hind tibia blackish brown; hind tarsus reddish brown, its first segment a little darker except at its base and apex; wings moderately infuscate; first segment of abdomen black, its apical 0.2± reddish; second and following abdominal segments red.

Type: ♀, Parker Creek, Sierra Ancha, Ariz., May 9, 1947, H. and M. Townes (Washington, USNM 63778).

Paratypes: 3♂, 2♀, Oak Creek Canyon, Ariz., May 13, 14, and 16, 1947, H. and M. Townes (Townes). 2♂, 2♀, Parker Creek, Sierra Ancha, Ariz., May 4, 9, and 11, 1947, H. and M. Townes (Townes). ♂, near Roosevelt Lake, Ariz., April 21, 1947, H. and M. Townes (Townes). ♂, Workman Creek, Sierra Ancha, Ariz., May 6, 1947, H. and M. Townes (Townes).

We found the species in chaparral country, flying among the bushes in the morning, before heat became intense.

This species occurs in the Transition zone of Arizona, in chaparral areas.

16. Trachysphyrus strigosus (Pratt)

Cryptus strigosus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 583; ♂, ♀. Type: ♀, Carrville, Trinity Co., Calif., 2,400 to 2,500 ft. (San Francisco). Type not seen.

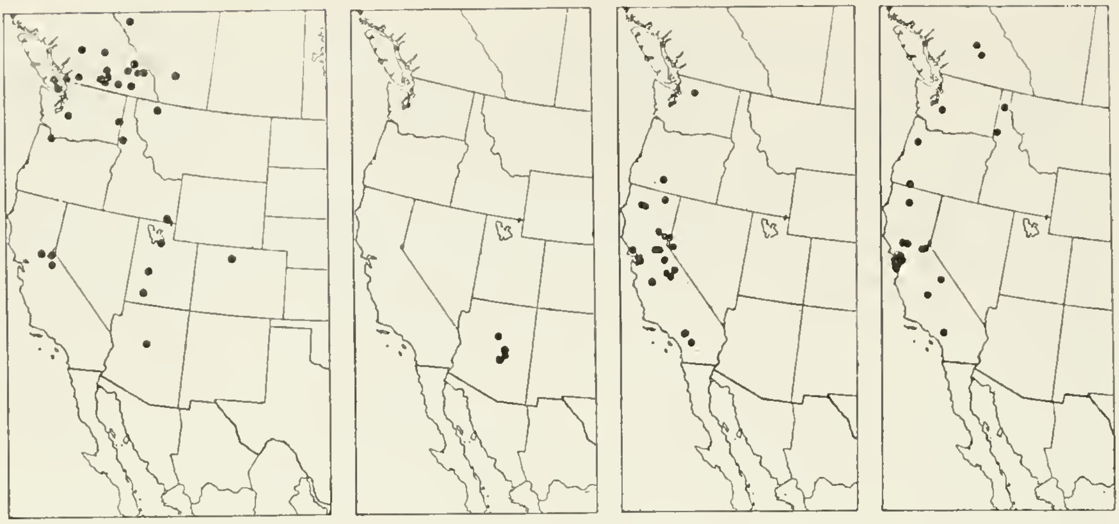
Front wing 6.5 to 9.5 mm. long; structurally similar to *T. lochmaius* except that the temple is a little longer, less convex, and flat at its midheight.

Male: Black. Face, clypeus, narrow frontal orbit, narrow temporal orbit except above, cheek, mouth parts, front of scape, upper margin of pronotum, and subtegular ridge, yellow; tegula yellow basally, fulvous apically; front and middle coxae and trochanters yellow, ferruginous above; front and middle legs beyond coxae ferruginous; hind leg ferruginous, its tibia somewhat infuscate apically and the apical 0.6± of its basitarsus, all of tarsal segments 2–4, and base of tarsal segment 5, yellow; wings faintly infuscate; abdomen ferruginous.

Female: Black. Narrow front and hind orbit and a stripe on cheek, yellowish; mandible partly fulvous; palpi dark brown; scape ferruginous; flagellum stained with ferruginous below; legs and abdomen ferruginous; wings moderately infuscate.

This and *T. lochmaius* are probably only subspecifically distinct, but the specimens at hand show no tendency to intergrade.

Specimens (34♂, 12♀): From California (Berkeley, Boca, Camino, Crystal Lake in Los Angeles Co., Dublin in Alameda Co., Fish Camp, Gold Lake in Sierra Co., Leevining, Mammoth in Modoc Co., Mesa Grande in Sonoma Co., Miami Ranger Station in Mariposa Co., Pinnacles National Monument in San Benito Co., Sagehen near Hobart Mills, San Jacinto River in San Jacinto Mts. at 3,000 ft., Snowline Camp in El Dorado Co., Strawberry, and Trinity Co. at 6,000 ft.); Nevada (Genoa); Oregon (Eagle Ridge at Klamath Lake); and Washington (Red Mt.).



FIGURES 104–107.—Localities: 104 (left), *Trachysphyrus dorsicarinatus;* 105 (center, left) *T. lochmaius;* 106 (center, right), *T. strigosus;* 107 (right), *T. crassifemur.*

Collection dates are mostly in May and June. Those outside of these months are: April 24 at Pinnacles National Monument, San Benito Co., Calif.; April 30 at Dublin, Alameda Co., Calif.; July 11 at Fish Camp, Calif.; July 19 at Gold Lake, Sierra Co., Calif.; July 21 at Sagehen, near Hobart Mills, Calif.; and August 18 at Red Mountain, Wash.

This species ranges from Washington to southern California, in the Transition zone.

17. Trachysphyrus crassifemur (Pratt)

Cryptus crassifemur Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 582; ♂, ♀. Type: ♀, Corvallis, Oreg. (Washington).

Front wing 6.2 to 9.4 mm. long; body very stout; lower half of frons with weak, fine transverse wrinkling, its pits moderately deep; first segment of female flagellum about 6.0 as long as wide; temple weakly convex, at its midheight almost flat; notaulus not reaching center of mesoscutum, about 0.30 as long as the mesoscutum (notaulus reaching well beyond center of mesoscutum in all other Nearctic species of the genus); mesopleurum subpolished, its punctures rather small, separated by a little more than their diameter, centrally the mesopleurum with some fine horizontal or slightly oblique wrinkling which is more extensive in the female than in the male; hind femur of male about 5.4 as long as deep, of female about 3.7 as long as deep.

Male: Fulvous. Face, orbit, cheek, more or less of lower part of temple, clypeus, mouth parts, front of scape, upper and lower margins of pronotum, subtegular ridge, and under side of front and middle coxae and trochanters, yellow; frons except near eye, back of head, upper side of scape, all of pedicel and flagellum, and sutural markings on thorax, black; hind tibia, basal 0.4 ± of segment 1 of hind tarsus, and apical 0.8± of segment 5 of hind tarsus brownish fulvous, the rest of hind tarsus yellowish white; wings with a brown tinge.

Female: Fulvous. Flagellum, center of occiput, and sutural markings on thorax black, the flagellum more or less fulvous basally; wings medium brown.

Specimens (32♂, 15♀): From British Columbia (Adams Lake and Vernon); California (Alamo, Berkeley, Bigpine Creek in Inyo Co. at 4,500 ft., Camino, Coffee Creek in Trinity Co., Davis, Los Altos, Mount Diablo, Redwood City, Sacramento, San Francisco, Santa Cruz Mts., Snowline Camp in El Dorado Co., Stanford University, Tanbark Flat in Los Angeles Co., and Wood Lake in Tulare Co.); Idaho (Lewiston and Sandpoint); Oregon (Corvallis and Siskiyou Pass in Jackson Co. at 4,500 ft.); and Washington (Paradise Valley on Mount Rainier).

Collection dates are mostly from April 16 to June 30. Those outside of this range are: "March" at Davis, Calif.; April 5 at Redwood City, Calif.; April 8 at Wood Lake, Tulare Co., Calif.; July 3 at Snowline Camp, El Dorado Co., Calif.; July 15 at Siskiyou Pass, 4,500 ft., Jackson Co., Oreg.; July 17 at Vernon, B.C., and at Paradise Valley, Mount Rainier, Wash.; and September 15 at Davis, Calif.

This species ranges from British Columbia to southern California, in the Transition zone.

IV. ALBITARSIS GROUP

Hairs on head, thorax, and coxae usually short but in *T. arcticus* long and erect; temple smooth, with distinct punctures; frons rather weakly to rather strongly concave, without even a trace of a pit dorsolaterad of each antennal socket, its lower 0.3± usually smooth or transversely wrinkled, the rest punctate, rugulose, wrinkled, or punctatorugulose, the wrinkling or rugulosity usually with a transverse direction or bias; epomia usually long, straight, and strong (absent in *arcticus*); basal transverse carina of propodeum usually strong; front tarsus of female not widened; areolet pentagonal, its sides about equal, usually strongly convergent so that front side of areolet is very short, the areolet usually much higher than wide; second recurrent vein usually rather long, usually more or less sinuate but often simply arched; axillus vein parallel to or convergent toward inner hind margin of hind wing; ovipositor usually rather long, its tip sagittate. The propodeal spiracle is usually elongate but in *T. luctuosus, T. moschator*, and some related Palearctic species it is rather broadly elliptic.

This is the largest group of the genus and the most diverse. Some of the very common species have the areolet strongly narrowed above, second recurrent vein sinuate, epomia long and straight, and basal transverse carina of propodeum rather strong. These are easily recognized as related to one another, but some others with shorter or more curved epomia, simply arched second recurrent vein, and often differently shaped areolets or with basal carina of propodeum weak, show more or less relationship with the Laborator group and add heterogeneity to the concept of the Albitarsis group. Narrower and more exact limits to the Albitarsis group, however, do not seem feasible at this time. Most of the species are in the Holarctic region and in southern South America. The Ethiopian *Cryptus madecassus* Seyrig, 1952, and *Cryptus suturalis* Szépligeti, 1916, also belong here. *Trachysphyrus madecassus* (Seyrig) and *T. suturalis* (Szépligeti) are new combinations.

The more typical members of this group (as *albitarsis* and *persimilis*) occur in meadows with scattered bushes or in more or less open woods, the females spending much time searching for hosts at the soil surface.

18. Trachysphyrus luctuosus (Cresson)

Front wing 7.3 to 11.0 mm. long; frons moderately concave, its lower 0.3 usually transversely wrinkled, the rest ruguloso-punctate, the rugulosity usually with a transverse direction or bias; temple moderately wide; first segment of female flagellum 0.34 to 0.50 as long as wide; mesopleurum weakly mat, its punctures sharp, close, or crowded, medially the punctures obscured by rugulosity; transverse carinae of propodeum moderately strong, in females the basal carina often weak or obsolescent, in males the apical carina often weak or obsolescent; apical carina of propodeum forming a weak sublateral crest; propodeal spiracle about 1.3 as long as wide; ramellus very short, sometimes absent; second recurrent vein with a simple curve; areolet moderately large, rather regularly pentagonal, its sides moderately convergent and its front side only moderately narrowed; hair sockets on tergite 2 separated by about 1.5 the length of the hairs; ovipositor sheath about 0.38 as long as front wing; ovipositor tip exceptionally short, about 2.8 as long from nodus to apex as it is deep at nodus, the dorsal edge rather sharp just basad of nodus.

This species is Holarctic, with three subspecies as keyed and described below:

1. Hind femur black; apical carina of propodeum almost entirely lacking; lower 0.3 of frons not wrinkled; range: Japan.
18c. luctuosus atrifemur, new subspecies

Hind femur ferruginous or fulvous; apical carina of propodeum strong, moderately strong, or obsolescent; lower 0.3 of frons usually with transverse wrinkles 2

2. Wings subhyaline; hind femur fulvous; first segment of female flagellum about 3.8 as long as wide; range: Europe.
18a. luctuosus subquadratus (Thomson)

Wings weakly infuscate; hind femur ferruginous; first segment of female flagellum about 4.8 as long as wide; range: northern half of North America. **18b. luctuosus luctuosus** (Cresson)

18a. Trachysphyrus luctuosus subquadratus (Thomson), new status

Cryptus subquadratus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 478; ♀. Type: ♀, Esperöd, Skåne, Sweden (?Lund). Type not seen.

Cryptus holalpinus Heinrich, 1951, Bonner Zool. Beitr., vol. 3–4, p. 281; ♂, ♀. New synonymy. Type: ♀, Kalbling near Admont, 1,700 m., Steiermark, Austria (Townes).

Lower 0.3 of frons with more or less distinct transverse wrinkling; first segment of female flagellum about 3.8 as long as wide; apical carina of propodeum of male rather weak to quite strong.

Coloration as described for the subspecies *luctuosus* except that front and middle femora of male are often more or less blackish, front and middle tibiae of male are sometimes somewhat infuscate, pale coloration on femora and tibiae of both sexes is nearer to fulvous than ferruginous, tegula and subtegular ridge of female are black in the specimens at hand, segment 2 of male hind tarsus is entirely white, and wings are subhyaline.

Thomson's description of *subquadratus* calls for a white spot in the middle of the clypeus of the female. This character seems not to occur or to be abnormal for the present form, but all the rest of his description agrees perfectly.

Specimens: 6♂, 3♀ (all of them types of *holalpinus*) from Germany, (Berchtesgaden) and Austria (Steiermark).

18b. Trachysphyrus luctuosus luctuosus (Cresson)

Cryptus luctuosus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 290; ♀. Type: ♀, Colorado (Philadelphia).

Agrothereutes (*Itamoplex*) *ebenus* Viereck, 1917, Bull. Connecticut Geol. Nat. Hist. Surv., vol. 22, p. 333; [♀]. Type: ♀, Massachusetts (Philadelphia).

Cryptus caligatus Cushman, 1927, Proc. U.S. Nat. Mus., vol. 72, art. 13, p. 2; ♀. Type: ♀, Calgary, Alta. (Washington).

Lower 0.3 of frons with more or less distinct transverse wrinkling; first segment of female flagellum about 4.8 as long as wide; apical carina of propodeum of male weak or moderately strong.

Male: Black. Facial orbit, short narrow stripe on hind orbit, center of face, clypeus except marginally, mandible except base and apex, sometimes base of tegula, sometimes subtegular ridge, stripe on front of front coxa, and sometimes under side of front first trochanter, white; palpi dark brown, the base of segment 2 of maxillary palpus white in front; front and middle femora and tibiae and hind femur entirely ferruginous; front and middle tarsi reddish brown; basal 0.6 of second segment of hind tarsus and all of first segment fuscous; apical 0.4 of segment 2 and all of segments 3 and 4, white;

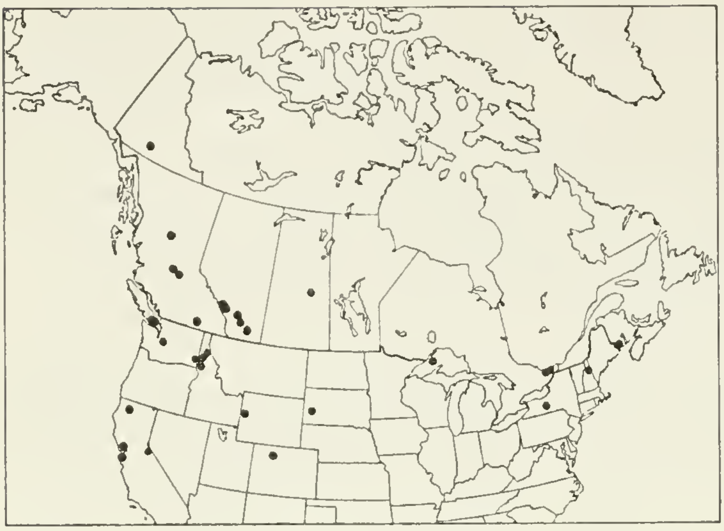


Figure 108.—Localities for *Trachysphyrus luctuosus luctuosus*.

segment 5 of hind tarsus pale brown; wings weakly infuscate; narrow apical margin of tergite 2, red.

Female: Black. More or less of orbit in front and short stripe on hind orbit, white; tegula and subtegular ridge varying from white to black; front and middle femora and tibiae varying from ferruginous to blackish; hind femur ferruginous; wings weakly infuscate; narrow apical margin of tergite 2, red.

Specimens (2♂, 49♀): From Alaska (Nome); Alberta (Banff, Calgary, High River, Lethbridge, and Vermillion Lake near Banff at 4,500 ft.); British Columbia (Likely, McConnell Creek, Robson, Royal Oak, Stanley, and Victoria); California (Big Flat on Coffee Creek in Trinity Co., Hope Valley in Alpine Co., Napa Co., and San Francisco Co.); Colorado (Steamboat Springs); Idaho (Collins, Moscow Mt , Waha, and Wallace); Michigan (Isle Royale); New Brunswick (St. Stephen); New Hampshire (Mount Washington); New York (Ithaca); Ontario (Dow's Swamp near Ottawa and Ottawa); Saskatchewan (Love); South Dakota (Black Hills 2 miles south of Custer); Washington (Mount Rainier at 4,700 and 5,300 ft., and Pullman); Wyoming (Hoback in Teton Co. at 6,500 ft.); and Yukon (Whitehorse).

Most collection dates are from July 2 to September 12. Those outside of this range are: June 14 at Ithaca, N.Y.; June 20 at Royal Oak, B.C.; June 23 at Coffee Creek, Big Flat, Tuolumne Co., Calif.; September 17 at Ottawa, Ont.; September 21 at Lethbridge, Alta.; and September 27 at High River, Alta.

There are two reared lots: 5♀, from cocoon of *Zaraea inflata*, St. Stephen, N.B., July 5 and Aug. 4 and 6, 1938, L. L. Reed. ♀, from cocoon of sawfly on *Tsuga heterophylla*, McConnell Creek, B.C., Oct. 20, 1940, M. L. Prebble. The only two males on record were collected at Nome, Alaska, July 2 and 10, 1951, by D. P. Whillans.

This subspecies is transcontinental in the Transition and Canadian zones. Males have been found only in Alaska.

18c. Trachysphyrus luctuosus atrifemur, new subspecies

Male: Lower 0.3 of frons not wrinkled; apical carina of propodeum obsolescent, distinguishable only at the position of the sublateral crest.

Black. White markings as described for male of *T. luctuosus luctuosus*, with the addition that front of scape, most or all of segments 2 and 3 of maxillary palpus, apical half of segment 1 of hind tarsus, and all of segment 2 of hind tarsus are white; segment 5 of hind tarsus fuscous, its base white. Legs black, the front side of front and middle femora and all of front and middle tibiae and tarsi fulvous brown to brown; base of hind tibia and extreme apex of hind femur brownish fulvous; hind tarsus white from middle of segment 1 to base of segment 5; wings weakly infuscate.

Type: ♂, Mount Norikura in Japan Alps, 2,200 m., Japan, July 29, 1954, H., M., D., and J. Townes (Washington, USNM 63779).

Paratype: ♂, same data as type (Townes).

19. Trachysphyrus moschator (Fabricius)

Front wing 5.8 to 7.9 mm. long; frons moderately concave, rather finely ruguloso-punctate, laterally only punctate, the rugulosity with a weak transverse bias, the lower 0.3 of frons almost smooth; temple rather narrow, first segment of female flagellum about 5.8 as long as wide; mesopleurum reticulate-rugulose, marginally with distinct punctures; basal transverse carina of propodeum very weak or absent; apical transverse carina of propodeum unusually strong, sublaterally forming a weak crest; propodeal spiracle about 1.6 as long as wide; ramellus long; second recurrent vein weakly sinuate; areolet narrowly pentagonal, the sides strongly convergent and the front side short; hair sockets on tergite 2 separated by about 1.5 the length of the hairs; ovipositor sheath about 5.8 as long as front wing; ovipositor tip about 4.0 as long from nodus to apex as it is deep at nodus.

There is a European and an Amercan subspecies, as keyed and described below:

1. Hind femur fulvous, its apical 0.1 sometimes faintly infuscate; hind basitarsus of male entirely fuscous; range: Europe.
19a. moschator moschator (Fabricius)
Hind femur fulvous with its apical 0.15 fuscous; hind basitarsus of male white with its basal 0.3± fuscous; range: Alleghanian fauna of North America.
19b. moschator iroquois (Viereck)

19a. Trachysphyrus moschator moschator (Fabricius)

Ichneumon moschator Fabricius, 1787, Mantissa insectorum, p. 266. Sex not stated. Type: sex?, Denmark (location unknown).

Male: Black. Narrow front orbit and narrow stripe on hind orbit, white; palpi fuscous; base of tegula sometimes white; second trochanters fulvous to fuscous; front and middle legs beyond trochanters fulvous, their tarsi darkened apically; hind femur fulvous, its apical 0.1 often faintly infuscate; segments 2–4 of hind tarsus white; wings subhyaline; apical margins of tergites 2 and 3 narrowly ferruginous.

Female: Black. Flagellum brown, blackish apically; legs colored as in male except that hind tarsus is entirely fuscous; wings subhyaline; apical margin of tergite 2 narrowly ferruginous.

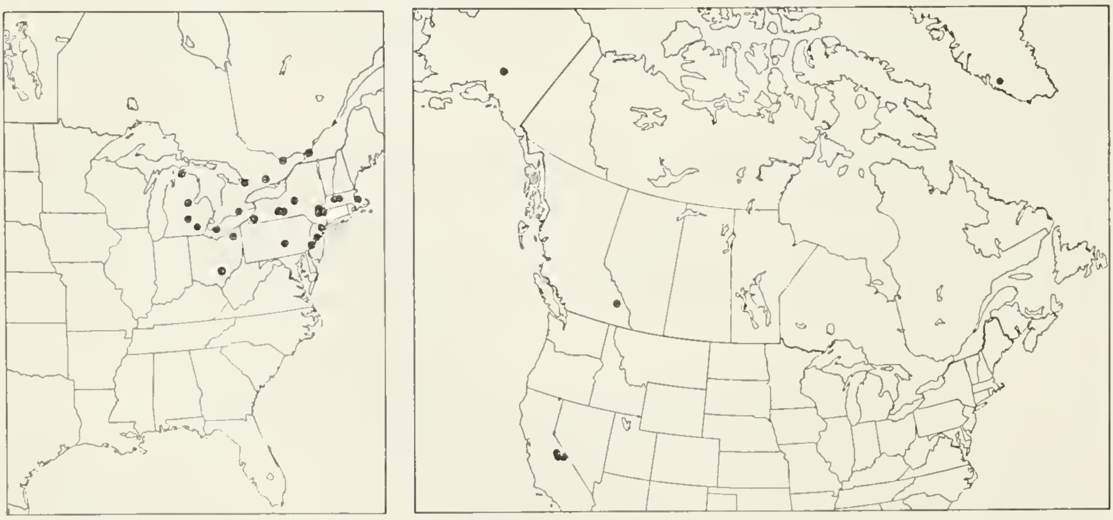
Specimens: 2♂, 2♀, from Netherlands and Germany.

19b. Trachysphyrus moschator iroquois (Viereck), new status

Agrothereutes (*Itamoplex*) *iroquois* Viereck, 1917, Bull. Connecticut Geol. Nat. Hist. Surv., vol. 22, p. 333; [♀]. Type: ♀, New York (Philadelphia).

Male: Black. Facial orbit, narrower frontal orbit, narrow stripe on hind orbit, sometimes spot on center of face, central part of clypeus, mandible except marginally, tegula, subtegular ridge, spot on scutellum, more or less of under side of front coxa and of front first trochanter, and sometimes stripe on under side of middle first trochanter, white; maxillary palpus brownish fulvous: labial palpus fuscous; second trochanters varying from fulvous to fuscous; front and middle legs beyond trochanters fulvous, their fifth tarsal segments brown; hind femur fulvous, its apical 0.15± fuscous; hind tarsus white, the apex of its last segment and basal 0.3± of its first segment fuscous; wings subhyaline; apical margin of tergites 2 and 3 narrowly ferruginous.

Female: Black. Front and hind orbits narrowly pale brown; flagellum with a brown tinge basally; subtegular ridge often with a white spot; second trochanters fuscous to fulvous; front and middle legs beyond trochanters fulvous, their tarsi brown apically; hind femur fulvous, its apical 0.15± fuscous; median segments of hind tarsus



Figures 109, 110.—Localities: 109 (left), *Trachysphyrus moschator iroquois;* 110 (right), *T. arcticus.*

paler than the rest; wings subhyaline; apical margin of tergite 2 narrowly ferruginous.

Specimens (38♂, 19♀): From Massachusetts (Cohasset, New Salem, and Petersham); Michigan (Ann Arbor, East Lansing, Emmet Co., and Midland Co.); New Jersey (Alpine and Somerville); New York (Bemus Point, Catskill Mts., Copake Falls, Greene Co., Ithaca, Ringwood in Tompkins Co., and Rome); Ohio (Bedford and Hocking Co.); Ontario (Constance Bay, Havelock, Normandale, Orillia, and Point Pelee); Pennsylvania (Chestnut Hill and Harrisburg); and Quebec (Montreal).

Dates of collection are from late spring to mid-fall. The earliest and latest records are: May 17 at Somerville, N.J., and at Ringwood, Tompkins Co., N.Y.; May 27 at Bedford, Ohio; May 28 at Normandale, Ont.; September 24 at Harrisburg, Pa.; October 6 at Ithaca, N.Y.; and "November" at Ithaca N.Y.

This subspecies occurs in the Alleghanian fauna.

20. Trachysphyrus arcticus (Schiødte)

Cryptus arcticus Schiødte, 1857, *In* Rink, Grønland geographisk og statistisk beskrevet, vol. II, pt. 3, p. 57; ♂, ♀. Types: ♂, ♀, Greenland (Copenhagen).

Front wing 6.3 to 9.4 mm. long; hairs of head, thorax, and coxae very long, dark brown, erect but more or less curled; cheek 1.7± as long as basal width of mandible (about 1.0 as long as basal width of mandible in other species of the Albitarsis group); epomia absent (present and usually long and straight in other species of the Albitarsis group); mesopleurum rather finely rugulose, marginally with some indistinct punctures; second recurrent vein weakly sinuate.

Black. Hind orbit of female sometimes with a small brown mark; legs beyond trochanters fulvoferruginous; wings of male weakly infuscate, of female moderately infuscate; abdomen ferruginous, the basal 0.7± of first segment, male clasper, and apical part of tergite 7 of male fuscous.

Specimens: 2♀, Mount McKinley National Park, Alaska, F. W. Morand (Washington). ♀, Rogers Pass at 4,500 ft., B.C., Aug. 1, 1908, J. C. Bradley (Ithaca). ♀, Mono Pass, Inyo Co., Calif., Aug. 13, 1957, D. D. Linsdale (Berkeley). ♀, Mono Pass, Inyo Co., Calif., Aug. 13, 1957, J. Powell (Berkeley). ♂, ♀, near Mono Pass at 12,000 ft., Inyo Co., Calif., Aug. 15, 1957, C. D. MacNeil (San Francisco). ♂, White Mt. at 14,000 ft., Mono Co., Calif., July 21, 1953, J. T. Brooks (Berkeley). ♂, White Mt. at 14,000 ft., Calif., July 21, 1953, J. W. MacSwain (Berkeley). 2♂, 9♀, Sondrestrom Air Base, Greenland, June 16, 18, 19, 23, and 27, 1952, W. J. Brown (Ottawa). 3♀, Sondrestrom Air Base, Greenland, June 16, 1952, W. J. Brown (Townes). 2♂, 8♀, Eureka, Ellesmere Island, N.W.T., June 29 and July 4, 10, 21, and 28, 1953, and June 30, 1954, P. F. Bruggemann (Ottawa).

This species is Arctic and Arctic-Alpine. It has been found in only a few, widely separated localities.

21. Trachysphyrus rugosiscutum (Pratt)

Front wing 6.7 to 11.0 mm. long; body form quite slender; sculpture of head and thorax very dense and strong, the mesoscutum rugulose on margins and along notauli, the notauli not sharp except anteriorly; mesopleurum with dense, strong rugulosity; propodeal crests tooth-like; front side of areolet about 0.65 as long as distal side; second recurrent vein rather long, simply arched or faintly sinuate; tergites 2 and 3 strongly mat.

There are four subspecies, as keyed and described below:

1. Coxae red; range: California and Oregon.
21d. rugosiscutum rugosiscutum (Pratt)
Coxae black 2
2. Femora black; range: Canadian zone of Colorado, Arizona, and New Mexico; also in Mexico . . . . **21c. rugosiscutum flagellatus** (Pratt)
Femora red 3
3. Basal transverse carina of propodeum about as strong and sharp as apical transverse carina; wrinkling on mesopleurum a little coarser; flagellum brown, its fourth and fifth segments not marked with white; range: Mexico.
21a. rugosiscutum binarius, new subspecies
Basal transverse carina of propodeum distinctly weaker than apical transverse carina; wrinkling on mesopleurum a little finer; flagellum blackish brown, its fourth and fifth segments often marked with black; range: Upper and Lower Sonoran faunas of Arizona and New Mexico.
21b. rugosiscutum crassisculptus (Pratt)

21a. Trachysphyrus rugosiscutum binarius, new subspecies

Male: Unknown.

Female: Mesopleurum and metapleurum with strong, irregular, moderately coarse wrinkling; basal transverse carina of propodeum strong and sharp, as sharp as the apical transverse carina and averaging a little closer to apical carina than in the other subspecies; median elevation of postpetiole at spiracles rather strong.

Coloration as in the subspecies *crassisculptus* except that flagellum is brown, without white marking.

Type: ♀, Distrito Federal, Mexico, June 1 to 10, 1915, R. H. Van Zwaluwenburg (Washington, USNM 63780).

Paratypes: ♀, 14 miles west of Huauchinango, Puebla, Mexico, June 17, 1951, P. D. Hurd (Berkeley). ♀, 14 miles west of Huauchinango, Puebla, Mexico, June 17, 1951, H. E. Evans (Townes). 2♀, San Miguel, Hidalgo, Mexico, W. M. Mann (Cambridge and Townes).

This subspecies occurs in Mexico.

21b. Trachysphyrus rugosiscutum crassisculptus (Pratt), new status

Cryptus crassisculptus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 573; ♂, ♀. Type: ♀, Huachuca, Ariz. (Lawrence). Type not seen.

Mesopleurum and metapleurum with strong, irregular, moderately fine wrinkling; basal transverse carina of propodeum distinct but weak and mostly not sharp; median elevation of postpetiole at spiracles usually rather weak.

Male: Black. Orbit in front, above, and partially behind, mark on upper center of face (usually V-shaped), central part of clypeus and of mandible, stripe on front of scape, mesal part of tegula, extreme hind corner of pronotum, subtegular ridge, and under side of front and middle coxae and first trochanters, white; palpi fuscous, the median segments of maxillary palpus white with a brown stripe below; femora red, the front femur whitish in front; front and middle tibiae and tarsi light brown, the upper edge of the tibiae white; hind tibia and basitarsus fuscous, the tibia reddish below and apical 0.3 of basitarsus white; segments 2–5 of hind tarsus white, the apical 0.5± of segment 5 fuscous; wings hyaline; abdomen red.

Female: Black. Front, top, and most of hind orbit white; front edge of mandible whitish or light brown; palpi fuscous; flagellum blackish brown, its fourth and fifth segments often more or less white; tegula brown, with a basal whitish spot; subtegular ridge pale brown; legs beyond trochanters dull red; wings subhyaline; abdomen red. Sometimes there are reddish stains on the thorax.

Specimens (8♂, 22♀): From Arizona (near Alpine, Cave Creek, Chiricahua Mts. at 7,000 ft., Oak Creek Canyon, Parker Creek in Sierra Ancha, near Roosevelt Lake, Rose Creek in Sierra Ancha, Santa Catalina Mts., Southwest Research Station near Portal, Tucson, and Workman Creek in Sierra Ancha); New Mexico (Jemez Springs); and Texas (Boot Spring at 6,000 to 7,000 ft. in Chisos Mts. in Big Bend National Park).

Most collection dates are from April 21 to May 30. Those outside of this period are January 11 at Cave Creek, Ariz., and July 15 in the Santa Catalina Mountains, Ariz.

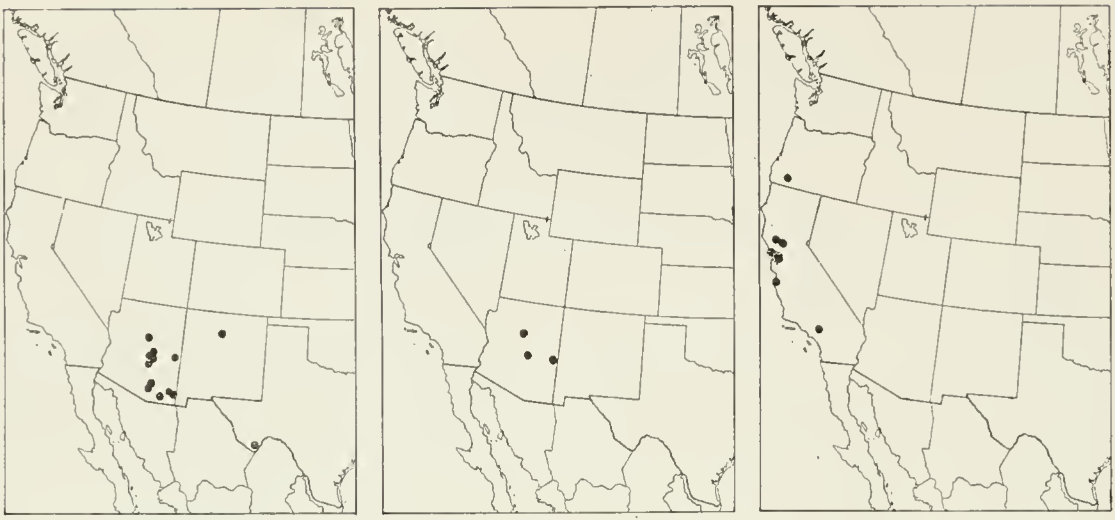
This subspecies occurs in Arizona, New Mexico, and Texas, in the Transition and Canadian zones. It is adult in spring and early summer.

21c. Trachysphyrus rugosiscutum flagellatus (Pratt), new status

Cryptus flagellatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 574; ♀. Type: ♀, Colorado (Philadelphia).

Male: Unknown.

Female: Colored like female of the subspecies *rugosiscutum* except as follows: Mandible, palpi, femora, subtegular ridge, and tegula,



Figures 111–113.—Localities: 111 (left), *Trachysphyrus rugosiscutum crassisculptus;* 112 (center), *T. r. flagellatus;* 113 (right), *T. r. rugosiscutum.*

black, the tegula with or without a basal white spot; flagellum entirely black; front and middle tibiae and tarsi black or brown; hind tibia black; segment 1 of hind tarsus fuscous, its extreme apex stramineous; segments 2–5 of hind tarsus pale brown or stramineous, the fifth segment fuscous apically; base of first abdominal segment more or less infuscate.

Specimens: 2♀, near Alpine, Ariz., May 28 and 29, 1947, H. and M. Townes (Townes). ♀, Bear Wallow on Mount Lemmon, Ariz., June 23, 1953, A. and H. Dietrich (Ithaca). ♀, Bear Wallow, Santa Catalina Mts., Ariz., June 21, 1953, G. M. Bradt (New York). ♀, Bear Wallow, Santa Catalina Mts., Ariz., Oct. 9, 1953, M. A. Cazier (New York). ♀, Mount Lemmon at 9,000 ft., Santa Catalina Mts., Ariz., Aug. 2–4, 1948 (Ottawa). ♀, Workman Creek, Sierra Ancha, Ariz., May 6, 1947, H. and M. Townes (Townes). ♀, "W. Cortez Pass," Mexico, Aug. 13, 1954, R. R. Dreisbach (Dreisbach).

This subspecies occurs in Arizona and in Mexico, mostly in the Canadian zone.

21d. Trachysphyrus rugosiscutum rugosiscutum (Pratt)

Cryptus rugosiscutum Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 572; ♀. Type: ♀, Carmel, Calif. (San Francisco). Type not seen.

Male: Unknown.

Female: Black. Front, top, and part of hind orbit narrowly pale yellow; clypeus centrally and part or all of mandible ferruginous; palpi dark brown; flagellar segments 4 and 5, and sometimes apex of 3 and base of 6 white above; small mark on collar yellowish; anteroventral corner of pronotum red; tegula reddish brown with a yellow spot basally; legs and abdomen red; wings hyaline. Sometimes the thorax has reddish areas, particularly on the center of metapleurum.

Specimens: ♀, Berkeley, Calif., Sept. 29, 1934 (Davis). 4♀, Davis, Calif., Oct. 11, 1955, Oct. 17, 1956, and Nov. 25, 1956, R. M. Bohart (Davis). ♀, Davis, Calif., Oct. 12, 1955, R. M. Bohart (Townes). 2♀, Davis, Calif., Oct. 19, 1956, R. B. Hewitt (Davis). ♀, Davis, Calif., October 1954, D. C. Force (Davis). ♀, Mill Valley, Marin Co., Calif., Apr. 26, 1925, E. P. Van Duzee (San Francisco). ♀, "Langlringvet," Calif., Oct. 30, 1949, Joan Linsley (Berkeley). ♀, Putah Canyon, Yolo Co., Calif., Oct. 22, 1947 (Berkeley). ♀, Tanbark Flat, Los Angeles Co., Calif., June 21, 1956, R. W. Bushing (Davis). ♀, Medford, Oreg., Sept. 9, 1950, A. T. McClay (Townes). ♀, no data (Townes).

This subspecies occurs in California and southern Oregon.

22. Trachysphyrus aridus (Pratt)

Front wing 4.3 to 7.0 mm. long; clypeus small; sculpture of head and thorax rather strong and dense; frons shallowly concave, sharply rugulose, the rugulosity mostly transverse; temple short, almost flat; mesoscutum with very fine dense punctures, near margins and notauli with transverse rugulae; mesopleurum centrally punctatorugulose in male, strongly rugulose in female; basal and apical carinae of propodeum rather strong, the two carinae well separated; sides of areolet strongly convergent; second recurrent vein moderately long, simply arched; first abdominal segment unusually slender, the postpetiole unusually narrow; ovipositor sheath about 0.44 as long as front wing.

There are two subspecies, as keyed and described below. We have no intergrades between them.

1. Hind coxa black; range: Minnesota to the mountains of California.
22a. aridus aridus (Pratt)
Hind coxa fulvous; range: Oregon, California, and Nevada.
22b. aridus ocellaris (Pratt)

22a. Trachysphyrus aridus aridus (Pratt)

Cryptus aridus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 618; ♀. Type: ♀, Nevada (Philadelphia).

Male: Black. Face white, the area around clypeus black; clypeus white or partly white; frontal orbit, stripe at top of eye, stripe on hind orbit, mandible, lower corner of propleurum, stripe on lower front corner of pronotum, stripe on collar, tegula, subtegular ridge, and extreme hind corner of pronotum, white; front of scape fulvous or whitish; palpi white, pale brown apically; front and middle coxae part white and part fuscous; front and middle trochanters white, the first trochanters with a fuscous stripe above; front and middle legs beyond trochanters fulvous, their tarsi brown apically; hind femur fulvous, its base and apex narrowly infuscate; apex of segment 1 of hind tarsus usually white or whitish; segments 2–4 of hind tarsus mostly or entirely white; wings subhyaline; abdomen fulvous.

Female: Black. Narrow stripes on front and hind orbits white, the stripe on hind orbit shorter; palpi and tegula medium to dark brown; subtegular ridge sometimes white; front and middle legs beyond first trochanter brownish fulvous to dark brown; hind femur fulvous, its base and apex more or less infuscate; hind tibia and tarsus brown or fuscous; wings faintly infuscate; abdomen ferruginous, its first segment often infuscate basally.

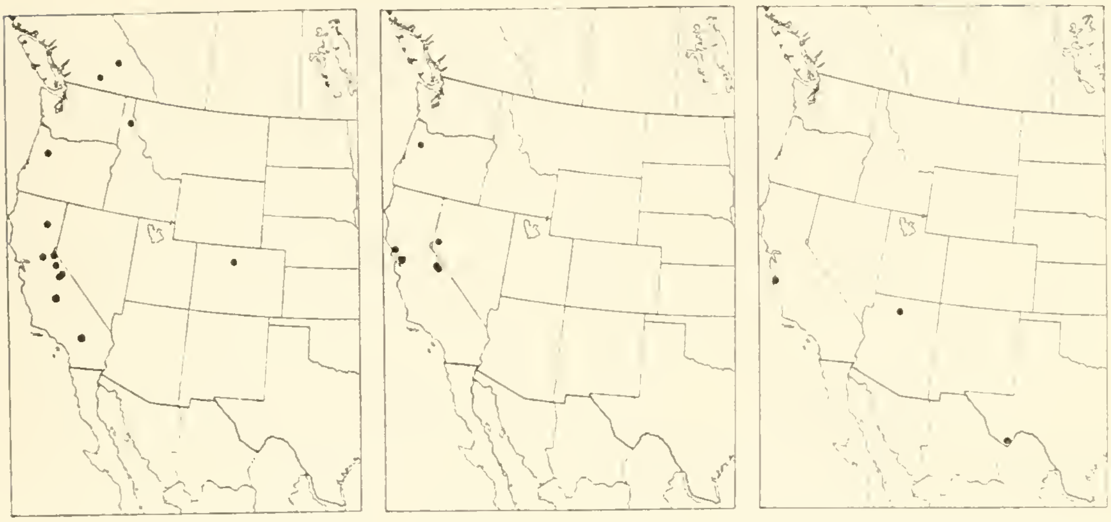
Specimens: ♀, on *Pinus ponderosa*, Aspen Grove, B.C., July 6, 1933, H. Richmond (Ottawa). ♀, reared from *Betula occidentalis*, Salmon Arm, B.C., June 1933, Hugh B. Leech (Ottawa). ♂, Camino, Calif., June 29, 1948, H., M., G., and D. Townes (Townes). ♀, Chester, Calif., July 7, 1948, D. J. and J. N. Knull (Columbus). ♀, Dollar Lake Trail, San Bernardino Mts., Calif., July 10, 1956, H. R. Moffitt (Townes). 3♂, ♀, Echo Lake, El Dorado Co., Calif., July 9, 1951, July 11, 1953, July 13, 1952, and July 19, 1955, W. W. Middlekauff (Berkeley). 4♂, near Glacier Point, Yosemite National Park, Calif., July 18, 1948, H., M., G., D., and J. Townes (Townes). ♀, Hot Creek, Mono Co., Calif., July 17, 1953, E. I. Schlinger (Davis). 5♂, ♀, Leevining, Calif., June 22 and 24, 1948, H., M., G., and D. Townes (Townes). ♂, Mineralking, Tulare Co., Calif., Aug. 4, 1922, C. L. Fox (San Francisco). ♂, E. Estes Park, Colo., June 7, 1956, R. and K. Dreisbach (Dreisbach). ♀, Wallace, Idaho, July 18, 1935, O. Huellemann (Pittsburgh). ♂, 10 miles north of Highway 20 on North Santiam River, Linn Co., Oreg., June 24, 1954, J. C. Downey (Davis).

This subspecies occurs from southern British Columbia to southern California, eastward to Colorado.

22b. Trachysphyrus aridus ocellaris (Pratt), new status

Cryptus ocellaris Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 617; ♀. Type: ♀, Reno, Nev. (Washington).

Male: Black. Face and clypeus (except for fuscous mark on each clypeal fovea and fuscous mark on apex of clypeus), cheek, orbit except on upper part of temple, mouth parts, front of scape, lower part of propleurum, upper and lower margins of pronotum, tegula, subtegular ridge, spot on scutellum, and front and middle first trochanters, white; front and middle coxae white, fulvous basally; front and middle legs beyond first trochanters fulvous; hind coxa, trochanters, and femur fulvous, the extreme apex of femur usually a little infuscate; hind tibia and tarsus fulvous brown, the tarsal segments 2–4 and apex of tarsal segment 1 mostly or entirely yellowish white or fulvous; wings subhyaline; abdomen fulvoferruginous.



FIGURES 114–116.—Localities: 114 (left), *Trachysphyrus aridus aridus;* 115 (center), *T. a. ocellaris;* 116 (right), *T. recurvatus.*

Female: Black. Orbit narrowly yellowish, with a short interruption on cheek and a wider interruption on upper part of temple; face, mouth parts, front of scape, and most of propleurum, various shades of brown; stripe on upper margin of pronotum, all of lower margin of pronotum, extreme hind corner of pronotum, tegula, and subtegular ridge, whitish; scutellum brown; legs fulvous, the hind tibia, hind basitarsus, and fifth segment of all tarsi tinged with brown; wings subhyaline; abdomen fulvous.

Specimens: ♀, Berkeley, Calif., May 30, 1933 (Townes). 4♂, Leevining, Calif., June 22 and 24, 1948, H., M., G., and D. Townes (Townes). ♂, Mesa Grande, Sonoma Co., Calif., June 1908 (Ithaca). ♂, Mono Lake, Calif., June 20, 1948, G. Townes (Townes). ♂ Corvallis, Oreg., June 11, 1925, E. C. Van Dyke (San Francisco).

This subspecies ranges from Oregon to central California, eastward to Reno, Nevada.

23. Trachysphyrus recurvatus (Pratt)

Cryptus recurvatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 616; ♀. Type: ♀, Real del Monte, Hidalgo, Mexico (Washington).

Front wing 7.2 to 8.0 mm. long; sculpture of head and thorax rather coarse and strong; clypeus moderately small; frons moderately concave; thorax rather elongate; mesoscutum with moderate sized, dense punctures; central part of mesopleurum ruguloso-punctate in both sexes; apical carina of propodeum much stronger than basal carina, rather evenly curved; areolet rather large, its sides strongly convergent above; second recurrent vein simply arched; first abdominal segment rather narrow, its spiracle nearer middle than usual, its postpetiole gradually widened; ovipositor sheath about 0.78 as long as front wing; ovipositor slender, subcylindric, gently upcurved.

Male: Black. Facial orbit, lower part of frontal orbit, and short mark at top of eye narrowly whitish; mandible largely white; palpi brown; front of scape fulvous; tegula sometimes with a small white spot at base; first trochanters fuscous, fulvous below; front and middle legs beyond first trochanters, fulvous; hind second trochanter and femur fulvous; hind tibia and segments 1 and 5 of hind tarsus fulvous brown; segments 2–4 of hind tarsus yellowish, the second segment fulvous basally; wings moderately infuscate; abdomen ferruginous.

Female: Black. Front and hind orbits narrowly white; legs dark brown or fuscoferruginous, the front and middle tibiae, front side of front femur, and segments 2–4 of hind tarsus a little paler; hind femur and abdomen ferruginous; wings moderately infuscate, in a specimen from Texas weakly infuscate.

Specimens: ♀, Yavapai Point, Grand Canyon, Ariz., June 18, 1943, L. Scheilbach (Washington). ♂, Carmel, Calif., Apr. 18, 1928, L. S. Slevin (San Francisco). ♀, Basin, Big Bend National Park, Tex., May 3, 1953, Howden and Becker (Ottawa).

This species ranges from central California to the Big Bend part of Texas, and southward into Mexico.

24. Trachysphyrus ruralis (Pratt)

Cryptus ruralis Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 637; ♀. Type: ♀, Virginia Dale, Colo. (Washington).

Male: Front wing 5.7 to 7.2 mm. long. Structure similar to that of *T. persimilis* but build a little more slender, pronotum and frons with a slightly stronger tendency toward wrinkling, and second recurrent vein a little less strongly sinuate.

Black. Face, clypeus, front part of cheek, frontal orbit, vertical orbit, narrow stripe on hind orbit, mandible, front of scape, tegula, subtegular ridge, usually a submarginal stripe on upper edge of pronotum, front and lower end of front coxa, spot on under side of middle coxa, and under side of front and middle first trochanters, white; second trochanters fulvous or fulvous and fuscous, the front and middle ones whitish below; legs beyond trochanters fulvous, the fifth tarsal segments fuscous, extreme apex of hind tibia infuscate, and hind tarsus fulvous brown to brown; wings weakly tinged with brown; abdomen ferruginous, the clasper blackish, the subgenital plate and usually base of first segment infuscate.

The male described above was considered by Pratt to be the male of his "*Cryptus associatus*" (1945, Amer. Midl. Nat., vol. 34, p. 633). Pratt's females of "*associatus*" are specimens of *persimilis*. We assign the males of Pratt's "*associatus*" to the present species, known previously only in the female. This correlation of sexes, however, is tentative.

Female type: Front wing 7.5 mm. long. Generally similar in structure to *T. recurvatus* except that apical carina of propodeum is a little weaker, hind femur about 7.0 as long as deep, second recurrent vein is moderately sinuate, dorsolateral and median longitudinal carinae of first abdominal segment a little stronger, ovipositor sheath 0.91 as long as front wing, and apical part of ovipositor, especially the tip, a little thicker and less distinctly upcurved.

Black. Front orbit, hind orbit, and stripe across top of eye, narrowly yellowish white; spot in center of clypeus, short submarginal stripe on upper part of pronotum, hind corner of pronotum, and subtegular ridge, narrowly yellowish white; front and middle femora dark brown, their tibiae and tarsi brownish fulvous; hind femur ferruginous; hind tibia and tarsus brown, the tarsal segments 2–4 paler; wings infuscate; abdomen ferruginous.

Female paratype: Similar in general to the type but the white markings restricted to a very narrow stripe on hind orbit. The front wing is 9.0 mm. long and ovipositor sheath 0.71 as long as front wing. We did not compare this paratype directly with the type. Possibly it is not the same species.

Specimens: ♀ (paratype), Lethbridge, Alta., July 16, 1913, E. H. Strickland (Ottawa). ♂, Big Bend Country, Selkirk Mts., B.C., July 20–22, 1905, J. C. Bradley (Ithaca). ♂, 4 miles west of Princeton in Yale Region, B.C., June 3, 1957, E. I. Schlinger (Davis). 8♂, Robson, B.C., June 7, 12, 23, 1948, July 30, 1947, Aug. 1, 1947, and Aug. 26, 1949, H. R. Foxlee (Ottawa). 2♂, near Estes Park, Colo., June 15 and Aug. 14, 1948, H., M., G., D., and J. Townes (Townes). ♀ (type), Virginia Dale, Colo., Aug. 15, 1903 (Washington). ♂, Chilco, Kootenai Co., Idaho, May 21, 1958, A. R. Gittins (Moscow). ♂, Aweme, Man., June 5, 1917, N. Criddle (Ottawa). ♂, Minton, Sask., Aug. 12, 1955, C. D. Miller (Ottawa). ♂, Weyburn, Sask., July 10, 1945, J. G. Rempel (Townes).

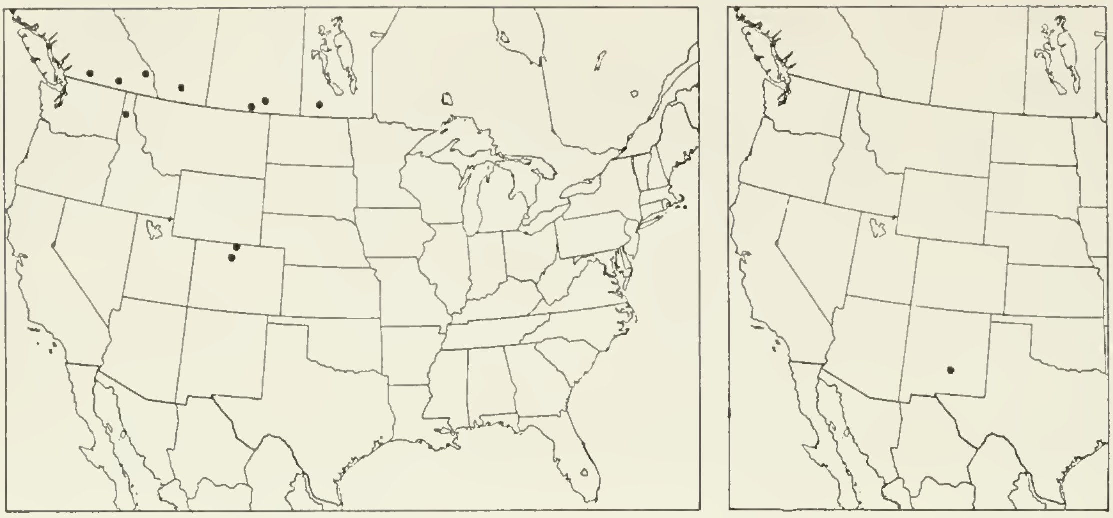
This species ranges from southern Manitoba and southern British Columbia, southward to northern Colorado.

25. Trachysphyrus atritibialis (Pratt)

Cryptus atritibialis Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 636; ♂, ♀. Type: ♀, Alamogordo, N. Mex. (Philadelphia).

Similar in general to *T. mentigus rhodomerus* but the ovipositor sheath 0.78 as long as front wing.

We have seen only the type female, from Alamogordo, New Mexico. Pratt records also a second female from Alamogordo, a female from Bozeman, Montana, and a male from Jackson, Wyoming.



Figures 117, 118.—Localities: 117 (left), *Trachysphyrus ruralis;* 118 (right), *T. atritibialis.*

26. Trachysphyrus mentigus, new species

Front wing 5.6 to 10.3 mm. long; face 1.55 to 2.2 as wide as high (somewhat narrower in most other Nearctic species, in the Albitarsis group the face also unusually wide in *crassulus* and *minimus*); clypeus transversely elliptic, in profile the basal half strongly convex and the apical half approximately flat; temple about 1.0 as long as eye, its front 0.55 weakly convex or almost flat, its hind 0.45 strongly convex; frons moderately concave, rather finely rugulose, the rugulosity irregular but largely transverse; mesopleurum of both sexes reticulate rugulose, marginally smoother and with some distinct punctation; propodeum rather evenly rounded, its basal carina strong, at about its basal 0.33; apical carina of propodeum placed at about the apical 0.33 of propodeum, strong sublaterally, forming a broad, weak sublateral crest, its median 0.3± absent or weak; front tibia not swollen, gradually narrowed to base; hind femur about 4.8 as long as deep in male, about 4.5 as long as deep in female; areolet narrowly pentagonal, its sides rather strongly convergent; second recurrent vein moderately sinuate; first abdominal segment short and stout; ovipositor sheath about 0.47 as long as front wing.

There are three subspecies, as keyed and described below:

1. Thorax ferruginous; range: Lassen Co., California.
26b. mentigus rufator, new subspecies
Thorax black 2
2. Hind femur black or black with a reddish brown tinge; range: Arizona.
26a. mentigus mentigus, new subspecies
Hind femur ferruginous; range: Alaska to California and New Mexico.
26c. mentigus rhodomerus, new subspecies

26a. Trachysphyrus mentigus mentigus, new subspecies

Male: Black. Facial orbit, narrow frontal orbit, very narrow orbital stripe at top of eye and on temple, front edge of mandible, subtegular ridge, segments 2–4 of hind tarsus, and sometimes apex of segment 1 of hind tarsus, white; front and middle legs beyond trochanters blackish brown; hind femur often with a reddish brown tinge; wings fuscous; apex of segment 1 of abdomen often red, the rest of abdomen red except that clasper is more or less infuscate.

Female: Black. Front and middle tibiae and all tarsi blackish brown; hind femur often with a reddish brown tinge; wings fuscous; apical 0.15± of first abdominal segment often red or tinged with red; second and following abdominal segments red.

Type: ♀, near Alpine, Ariz., May 25, 1947, H. and M. Townes (Washington, USNM 63781).

Paratypes: 3♂, 4♀, near Alpine, Ariz., May 25 and 28, 1947, H. and M. Townes (Townes). ♂, North Rim, Grand Canyon, 8,000 ft., Ariz., July 1, 1946, R. M. Bohart (Townes).

This subspecies occurs in Arizona, in the Canadian zone.

26b. Trachysphyrus mentigus rufator, new subspecies

Male: Unknown.

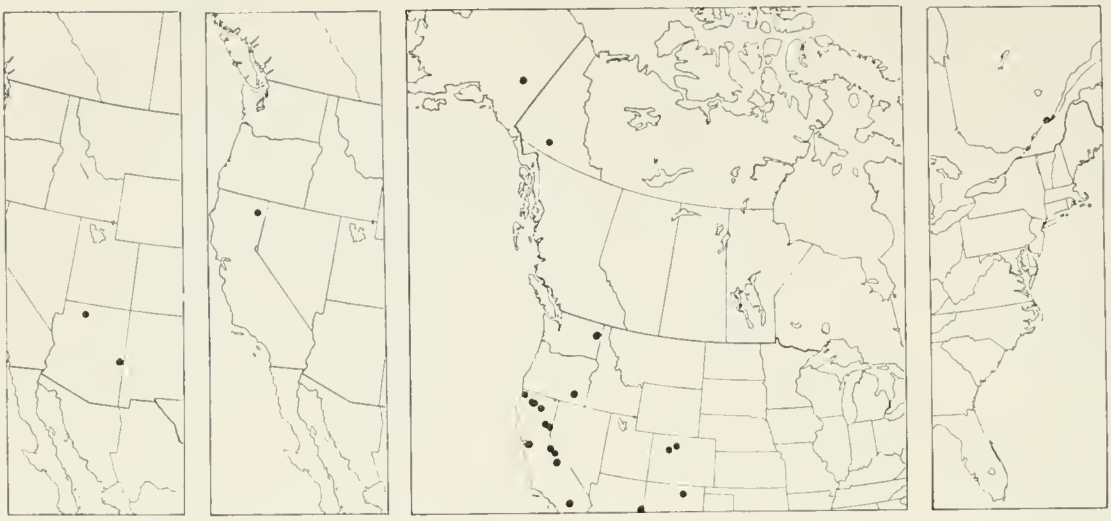
Female type: Ferruginous. Head near base of mandible, spot on frons above each antennal socket, areas laterad of scutella, and lower front edge of metapleurum, fuscous; palpi brown; flagellum fuscous, brown basally; orbits narrowly tinged with yellow in front and behind; subtegular ridge yellow; wings fuscous.

Type: ♀, Blue Lake, Lassen Co., Calif., July 19 to 20, 1947, D. W. Adams (Berkeley).

26c. Trachysphyrus mentigus rhodomerus, new subspecies

Male: Black. Broad facial orbit, narrow frontal orbit, very narrow orbital stripe at top of eye and on temple, often spot in center of face, often median part of clypeus, usually front edge or all of mandible, subtegular ridge, and sometimes under side of front first trochanter, light yellow; front and middle legs beyond trochanters fulvous, often partly infuscate; hind femur ferruginous; hind tibia varying from ferruginous with the apex fuscous to entirely fuscous; hind tarsus fuscous, its median three segments usually white; wings moderately to strongly infuscate; first abdominal segment black, its apical 0.2± ferruginous, the rest of abdomen ferruginous except that clasper is infuscate.

Female: Black. Front and hind orbit usually with a very narrow yellow mark; palpi brown to black; subtegular ridge with a small yellow spot; femora and front and middle tibiae fulvous to ferruginous; tarsi and hind tibia fulvous to fuscous; wings fuscous; apical 0.3± of first abdominal segment ferruginous or stained with ferruginous; second and following abdominal segments ferruginous.



Figures 119–122.—Localities: 119 (left), *Trachysphyrus mentigus mentigus;* 120 (center left), *T. m. rufator;* 121 (center, right), *T. m. rhodomerus;* 122 (right), *T. crassulus.*

Type: ♂, Berkeley, Calif., Apr. 30, 1939, C. D. Michener (Washington, USNM 63782).

Paratypes (15♂, 11♀): From Alaska (Big Delta); Arizona (near Alpine); California (Berkley, Big Flat on Coffee Creek in Trinity Co., Blanco's Corral on White Mt. at 10,000 ft. in Mono Co., 10 miles north of Coffee Creek Ranger Station in Trinity Co., Crescent City, Glacier Lodge in Inyo Co., Gold Lake in Sierra Co., Moose Camp in Shasta Co., 1 mile north of Piute Mt. in Mono Co., 4 miles south of Riverside, and Sagehen near Hobart Mills); Colorado (near Estes Park and Troublesome at 7,345 ft.); New Mexico (Cimarron at 9,500 ft.); Oregon (Pike Creek in Steens Mts. at 4,300 ft.); Utah ("Kigalie Ranger Station in Manti-La Sal National Forest"); Washington (summit of Mount Spokane); and Yukon Territory (Whitehorse).

Dates of collection are mostly from May 25 to July 30. Those outside of this range are: April 30 at Berkeley, Calif.; August 2 at Crescent City, Calif.; and August 23 at Cimarron, 9,500 ft., N. Mex.

This subspecies ranges from Alaska to New Mexico and southern California.

27. Trachysphyrus crassulus (Pratt)

Cryptus crassulus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 586; ♀. Type: ♀, Quebec (Townes).

Male: Unknown.

Female: Front wing 9.7 to 10.0 mm. long; general structure about as in *T. mentigus* but a little more robust, the propodeum more coarsely sculptured, and the front tibia swollen, rather suddenly narrowed near base.

Black. Flagellum with a white band that covers 7 segments; front and middle tibiae blackish brown; front and middle tarsi light brown, the apex of their fifth segments darkened; hind femur fulvous, its base and apex narrowly infuscate; hind tarsus white, the basal 0.3 of first segment and apical 0.2 of last segment infuscate; wings faintly to moderately infuscate; abdomen ferruginous, the basal half of its first segment infuscate.

Specimens: ♀ (type), Quebec, Que., June 3, 1919, J. O. Roy (Townes). ♀, Chippewa Co., Mich., June 25, 1960, R. and K Dreisbach (Dreisbach). This latter locality is not shown on the map.

28. Trachysphyrus persimilis (Cresson)

Cryptus persimilis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 298; ♀. Type: ♀, Delaware (Philadelphia).

Cryptus picticoxus Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, pp. 82; ♂. Type: ♂, Illinois? (destroyed in Chicago fire of 1871).

Cryptus mundus Provancher, 1874, Naturaliste Canadien, vol. 6, pp. 177, 203; ♂. Lectotype: ♂, Quebec (Quebec).

Cryptus citrinimaculatus Viereck, 1905, Trans. Kansas Acad. Sci., vol. 19, p. 320; ♂. Type: ♂, Douglas Co., 900 ft., Kans. (Lawrence).

Cryptus associatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 633; ♀. New synonymy. [♂ = *T. ruralis*]. Type: ♀, Kaslo, B. C. (Washington).

Front wing 4.3 to 7.3 mm. long; lower half of frons with a small amount of weak, transverse wrinkling; clypeus rather wide and evenly convex; temple of moderate width, moderately convex; notaulus sharp, foveolate; mesopleurum with dense rather fine reticulation resulting from crowding of punctures; basal and apical carinae of propodeum moderately far apart; front tibia of female distinctly inflated; hind femur about 5.3 as long as deep in male, about 5.1 as long as deep in female; second recurrent vein strongly sinuate; ovipositor sheath about 0.67 as long as front wing; ovipositor slender, weakly upcurved, with a short wide tip, about 3.0 as long from nodus to apex as it is deep at nodus.

Male: Black. Orbit in front and at top of eye (broader on face), narrow stripe on hind orbit, dorsomedial spot on face, clypeus except its margins, part or all of mandible, palpi, spot on front of scape, tegula, often subtegular ridge, stripe on under side of front coxa, and under side of front and middle first trochanters, light yellow; front and middle second trochanters brown to fulvous, usually yellow below; front and middle legs beyond trochanters fulvous, their fifth tarsal segments brown; hind femur and tibia fulvoferruginous, the apical 0.25± of the tibia infuscate; hind tarsus brown or fuscous, paler at the joints, never marked with white; wings faintly tinged with brown; apical 0.18± of first abdominal tergite ferruginous; second and following tergites ferruginous; clasper fuscous.

Female: Black. Orbit narrowly yellowish in front and behind; center of clypeus sometimes yellowish; palpi and tegula fuscous; second trochanters partly ferruginous and partly fuscous; front and middle legs beyond trochanters ferruginous, their tarsi somewhat infuscate and fifth tarsal segments brown; hind femur and tibia ferruginous, the apical 0.05 to 0.15 of the tibia somewhat infuscate; hind tarsus fuscoferruginous or fuscous, paler at the joints; wings with a strong brownish suffusion; first abdominal segment varying from entirely ferruginous to blackish with its apical 0.2± ferruginous; second and following tergites ferruginous.

Specimens (294♂, 413♀): From Alberta ("Irving"); Arizona (Chiricahua Mts.); British Columbia (Kaslo, Okanagan, Okanagan Valley, Oliver, Robson, and Vernon); California (Claremont, Coffee Creek Ranger Station in Trinity Co., Gazelle, Howland Flat in Sierra Co., Humboldt Co., Riverside, San Diego, Sausalito, Sisson, and Strawberry Canyon in the Berkeley Hills); Colorado (Boulder, near Estes Park, Florissant, Steamboat Springs, and Sterling); District of Columbia (Washington); Idaho (Chilco, Melba, Murtaugh, Notus, Post Falls at 2,169 ft., and Priest River Experimental Forest); Illinois (Chicago, Harristown, and Jackson Co.); Indiana (Gibson Co. and Lafayette); Iowa (Buffalo Center, 6 miles northwest of Ledyard, Lyon Co., 5 miles east of Renwick, Ruthven, Sergeant Bluff, Sioux City, and Sioux Co.); Kansas (Clay Co., Douglas Co., Johnson Co., Manhattan, and Miami Co.); Kentucky (Lexington); Maine (Lincoln Co. and Orrs Island); Manitoba (Aweme, "Stormy Mt.," and Transcona); Maryland (Cabin John Bridge); Massachusetts (Arnold Arboretum in Boston, Greenfield, Holden, Nantucket, North Saugus, Rockport, Sherborn, Truro, West Bedford, West Springfield, and Winchendon); Michigan (Alpena Co., Alto, Ann Arbor, Cheboygan Co., Crawford Co., Detroit, East Lansing, Eight-point Lake in Clare Co., Gobles, Harbert, Houghton Co., Huron Co., Iosco Co., Isabella Co., Leelanau Co., Mackinac Co., Mackinac Island, Midland Co., Milford, Muskegon, northeast of Portage Lake in Livingston Co., Port Austin, South Haven, State Game Refuge northwest of Oscoda, Tecumseh, and Wayne Co.,); Minnesota (Fertile); Montana (Bozeman); Nebraska (Indianola); New Brunswick (Caraquet); Newfoundland (Harmon Field); New Hampshire (Hampton and Hanover); New Jersey ("Duttonville," Manasquan, and Merchantville); New York (Axton in the Adirondack Mts., Babylon, Bemus Point, Downsville, Fishers Island, Greene Co., Ithaca, Kirkville, Lockport, Long Beach, McLean Bogs in Cortland Co., North Fairhaven, Oswego, Penn Yan, Rockaway, Rome, and Stony Island); North Carolina (Black Mts., summit of Craggy Mt., Highlands at 2,800 ft., and Raleigh); North Dakota (Fargo, Lisbon, and Tower City); Nova Scotia (Baddeck, Baddeck Forks, Hants Co., and Truro); Ohio (Cleveland, Columbus, Hocking Co., Lakeside, Mongomery Co., Put-in-Bay on South Bass Island, Ross Co., Sandusky Co., and Tipp City);

Ontario (Georgetown, Grimsby, Hastings Co., Jockvale, Jordan, Lake of Bays, Leamington, Limerick Forest near Oxford Station, Marmora, Mer Bleue, Merivale, Orillia, Ottawa, Pelee Island, Point Pelee, Prince Edward Co., Spider Bay on Georgian Bay, Strathroy, Trenton, and Waubamick); Oregon (Humbug State Park in Curry Co.); Pennsylvania (Bowmansdale, Craigheads, Cresco, Harrisburg, Highspire, "Inglewood," Natrona, New Cumberland, Pittsburgh, Spring Brook, Uniontown, and Wilawana); Prince Edward Island (Dalvay House in Canadian National Park); Quebec (Brome, Cascapedia, Chandler, Danford Lake, Hemmingford, Hull, Joliette, Kazabazua, Lanoraie, Montreal, Norway Bay, Queen's Park in Aylmer, Rigaud, "Summerlea," Sweetsburg, and Val-Morin); Rhode Island (Westerly); Saskatchewan (Estevan, Regina, Secretan, Uren, and Weyburn); South Carolina (Greenville); South Dakota (Agar, Brookings, Lake Campbell, and Vermillion); Tennessee (Allardt); Texas (Gillespie [Co.], Hopkins Co., and Hunt Co.); Utah (Logan, Navajo Lake in Kane Co. at 9,000 ft., and 10 miles north of Orderville at 5,500 ft.); Vermont (Bennington); Washington (opposite Ellensburg on the Yakima River, Uniontown, Wenas Valley, and Westport); and Wisconsin (Door Co., East Troy, La Crosse Co., Madison, Milwaukee, Muskego, and Racine).

Collection dates are from late spring to late summer, most of them from late May to late July. The only records before May or after August are: April 3 at Oliver, B.C.; April 9 at Riverside, Calif.; April 16 at Sausalito, Calif.; April 27 at Raleigh, N.C.; September 4 and 8 Lafayette, Ind.; September 4 at Truro, Mass.; September 6 at East Lansing, Mich.; September 7 at Greenville, S.C.; September 11 at Gazelle, Calif.; and October 3 in Montgomery Co., Ohio.

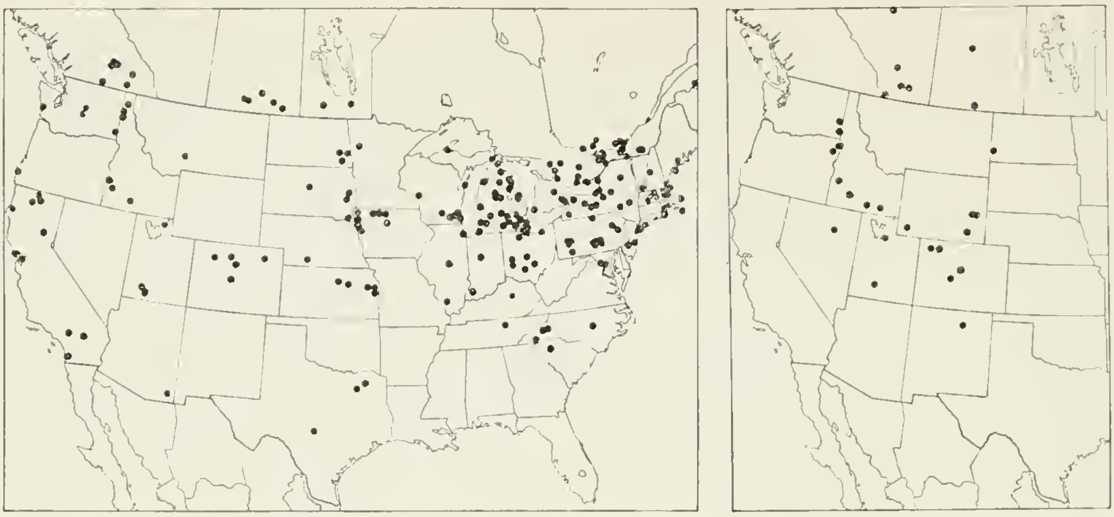
The usual habitat is shaded grassy places. Adults commonly go to flowers. Among the specimens at hand, three lots are labeled as having been taken on flowers, two on *Daucus carota* and one on *Sambucus canadensis*.

This species is transcontinental in the Transition and Upper Austral zones.

29. Trachysphyrus minimus (Pratt)

Cryptus minimus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 619; ♀. Type: ♀, Oakley, Idaho (Washington).

Front wing 4.6 to 7.0 mm. long; lower half of frons with small punctures, mat, and with indistinct or rather weak transverse wrinkling; temple moderately long, strongly and evenly convex; clypeus of moderate size, rather strongly convex; flagellum short, with about 27 segments; punctures on mesoscutum rather sparse, those on the lateral lobe separated by about 1.0 their diameter; mesopleurum rather strongly, reticulately wrinkled medially, more or less punctate



Figures 123, 124.—Localities: 123 (left), *Trachysphyrus persimilis;* 124 (right), *T. minimus.*

marginally; wrinkling on propodeum coarse; transverse carinae of propodeum moderately well separated; front tibia of female strongly inflated; hind femur about 4.7 as long as deep; second recurrent vein strongly sinuate; ovipositor sheath about 0.51 as long as front wing.

Male: Black. Face, narrow orbit, front part of cheek, clypeus, mandible, front of scape, tegula, upper margin of pronotum, subtegular ridge, collar, lower end of propleurum, usually a spot on scutellum, lower part of front and middle coxae, and under side of front and middle first trochanters, ivory; clypeal fovea fuscous; a narrow fuscous stripe sometimes between clypeal fovea and antennal socket; temple, metapleurum, and propodeum often partly fulvous; palpi brownish fulvous; second trochanters fulvous or partly infuscate, the front and middle ones whitish below; front and middle legs beyond trochanters fulvous, their femora and tibiae paler in front and their fifth tarsal segments brown; hind femur and tibia fulvous, the apex of tibia infuscate; hind tarsus brownish fulvous to fuscous, paler at the joints; wings with a faint yellowish brown tinge; abdomen fulvous, its first segment infuscate basally, the clasper and subgenital plate fuscous. In one specimen from Manville, Wyoming, all the abdominal tergites are largely infuscate.

Female: Fulvous. Ocellar area, restricted areas near wing bases, and sometimes parts of frons, coxae, trochanters, and sutural markings on thorax, fuscous; apex of hind tibia weakly infuscate; tarsi brownish apically; wings with a yellowish brown tinge.

Specimens (6♂, 43♀): From Alberta (Edmonton, Gleichen, Lethbridge, Taber, and Waterton); Colorado (Denver, Florissant, Moffat Co. at 6,000 to 7,000 ft., and Mount Harris); Idaho (Boise, Oakley, Sublett, and Tuttle); Nevada (Red House Ranch in Eureka Co.); New Mexico (Springer); North Dakota (Beach); Oregon (Enterprise at 3,750 ft., and 9 miles east of Imnaha); Saskatchewan (Big Muddy and Saskatoon); Utah (Bryce Canyon National Park at 7,000 ft., and Salt Lake City); Washington (Clarkston and Pullman); and Wyoming (Horse Creek Ranger Station northwest of Cheyenne, Lusk, Manville, and Uinta Co.).

Collection dates are from mid-spring to late summer, with a peak of abundance in June and July. The records before June and after August are: April 15 at Salt Lake City, Utah; May 11 at Red House Ranch, Eureka Co., Nev.; May 20 at Taber, Alta.; September 6 at Sublett, Idaho; and November 10 at Boise, Idaho.

Judging from a single series that we took and the data on other specimens, the usual habitat is in weedy areas.

This species ranges from Saskatchewan and Alberta south to northern New Mexico, in the Transition zone.

30. Trachysphyrus scapulatus, new species

Front wing 7.0 to 7.8 mm. long; general structure about as in *T. albitarsis,* differing as follows: Sculpture of head, thorax, and coxae distinctly stronger and denser than in *albitarsis*; face about 1.68 as wide as high (wider than in *albitarsis*); apical carina of propodeum well separated from basal carina (a little more separated than in *T. persimilis*), its sublateral crest low and broad; second recurrent vein weakly sinuate.

Male: Black. Face and clypeus white, the clypeus black marginally, the face next to clypeus black, and usually a broad sublateral black stripe on each side of face; frontal orbit and most of hind orbit narrowly pale yellow; mouth parts pale yellow, the palpi stramineous apically; lower corner of propleurum, upper and lower margins of pronotum, tegula, subtegular ridge, sometimes spot on scutellum, upper corner of mesepimeron, usually small spot on mesopleurum at base of middle coxa, usually small spot on propodeal crest, and under part of front and middle coxae and first trochanters, yellowish white; front and middle legs beyond first trochanters fulvous, the second trochanters brown above and the fifth tarsal segments light brown; hind trochanters fulvous and fuscous; hind femur fulvous, its apex narrowly infuscate and its extreme base a little infuscate; hind tibia dark brown; hind tarsus brown, the apical 0.3± of its first segment and all of segments 2–4 ivory; wings hyaline; abdomen ulvoferruginous, the clasper and sometimes apex of seventh tergite uscous.

Female: Black. Orbit (narrowest on upper part of temple and widest on face), center of face, clypeus except its dorsolateral edge, cheek, mandible, and thoracic markings as described for male, pale yellow; scape fulvous, fuscous above; palpi dark brown; scutellum and postscutellum with a fulvous tinge, the scutellum yellowish medially; propodeum with a poorly defined, broad fulvous band along and below its apical carina; legs dull fulvous, the front and middle coxae yellowish externally and the tarsi and hind tibia brownish fulvous; wings subhyaline; abdomen fulvoferruginous.

Type: ♂, Samuel Spring, Napa Co., Calif., Mar. 29, 1956, E. I. Schlinger (Davis).

Paratypes: ♀, Alum Rock Park, Santa Clara Co., Calif., May 25, 1950, E. G. Linsley (Berkeley). 2♂, Samuel Spring, Napa Co., Calif., Mar. 29, 1956, R. C. Bechtel (Davis). ♂, same data as type (Townes).

31. Trachysphyrus areolatus (Pratt)

Cryptus areolatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 629; ♀. Type: ♀, Mammoth [Lake], Calif. (San Francisco).

Male: Unknown.

Female type: Front wing 7.8 mm. long; general structure about as in *T. albitarsis* except that thoracic sculpture is a little rougher, apical carina of propodeum is a little more distant from basal carina and forming unusually large sublateral crests, and ovipositor sheath is 0.67 as long as front wing. Intercubiti strongly convergent, in one wing almost touching on the radial vein, in the other briefly separated.

Black. Hind orbit with a narrow white stripe; apical half of front femur in front, all tibiae, and all tarsi brown to blackish brown; hind femur ferruginous, its base and apex narrowly fuscous; wings moderately infuscate; abdomen red, the basal 0.4 of its first segment somewhat infuscate.

Specimen: ♀ (type), Mammoth Lake, Calif., Sept. 23, 1933 (San Francisco).

32. Trachysphyrus latigenalis (Pratt)

Cryptus latigenalis Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 611; ♀. Type: ♀, Hidden Valley, Rocky Mt. National Park (Washington).

Biology: Ullyett, 1949, Canadian Ent., vol. 81, pp. 285–299; 1950, vol. 82, pp. 1–11. Reported incorrectly in these papers as *Cryptus inornatus.*

Front wing 6.0 to 7.4 mm. long. General structure as in *Trachysphyrus albitarsis* except that temple is longer and flatter (about 0.80 as long as eye, at its midheight very weakly convex), thoracic sculpture a little denser and stronger, speculum rather closely rugosopunctate, and second recurrent vein arched and with almost no sinuation.

Male: Black. Orbit rather broadly white from cheek to near middle of frons and with a narrow white mark at vertex; palpi fuscous; tegula brown, sometimes partly whitish; front and middle femora fuscous, brownish apically; front and middle tarsi light brown, the tarsi darkened apically; segments 3 and 4 and sometimes more of hind tarsus, whitish; wings weakly infuscate; abdomen red, the clasper fuscous.

Female: Black. Orbit narrowly whitish in front, behind, and on vertex; apical part of front and middle femora and front and middle tibiae in front, brownish, the legs otherwise fuscous or black; wings moderately infuscate; abdomen red, its first segment partly infuscate basally.

This species was introduced into South Africa to control *Loxostege frustralis*, an important pest of a native pasture plant. The success of the introduction is not reported upon, but as an incident to the work Ullyett described the biology of the parasite in the two papers cited above. The host was *Loxostege sticticalis* in sugar beet fields in southern Alberta. The *Loxostege* makes its cocoon just below the soil surface. The parasite is particularly in evidence at the end of the second generation of *Loxostege* on the beet crop, attacking the overwintering prepupae in the soil during the mild, sunny weather of fall months.

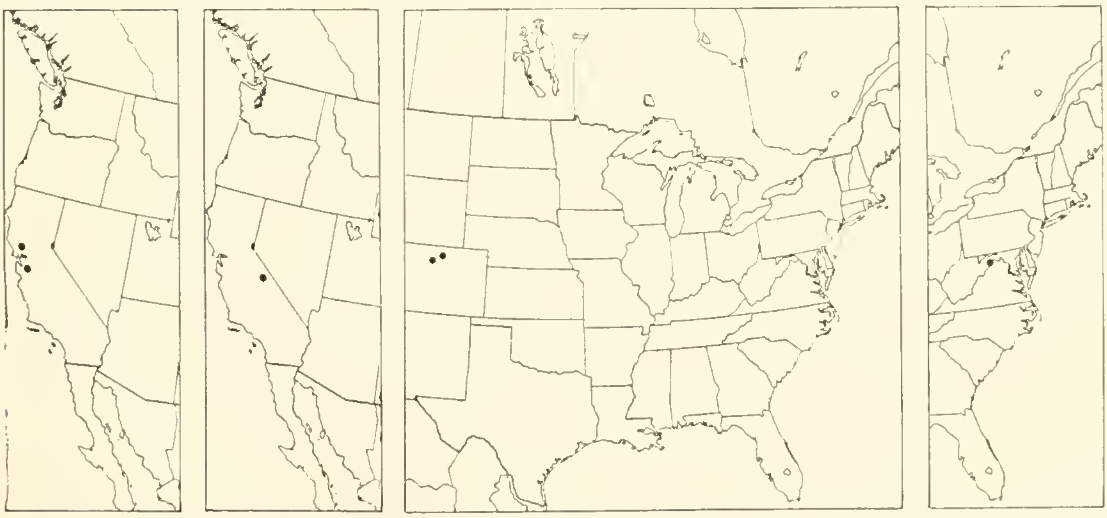
Specimens: ♂, ♀ (paratypes of *inornatus*), sweeping alfalfa, Fort Collins, Colo., May 9, 1894, C. F. Baker (Washington). 5♂, reared from *Loxostege sticticalis*, "Belleville, Ont.," F. J. Simonds (Washington and Townes). ♀, reared from *Loxostege sticticalis*, Montana, October 1941, F. J. Simonds (Washington).

This species ranges from southern Alberta to northern Colorado. It is a parasite of *Loxostege*.

33. Trachysphyrus krombeini, new species

Male: Unknown, probably similar to male of *T. albitarsis albitarsis*.

Female: Front wing 5.5 to 6.8 mm. long; similar in structure to female of *T. albitarsis* except that wrinkling on frons is a little weaker



Figures 125–128.—Localities: 125 (left), *Trachysphyrus scapulatus;* 126 (center, left), *T. areolatus;* 127 (center, right), *T. latigenalis;* 128 (right), *T. krombeini.*

and apical carina of propodeum is a very little more separated from basal carina.

Colored like the female of *T. albitarsis albitarsis* except that there is a white band on flagellar segments 4–9, the band brown below.

Type: ♀, Lost River State Park, Hardy Co., W. Va., July 1, 1953, K. V. Krombein (Washington, USNM 63783).

Paratype: ♀, Lost River State Park, Hardy Co., W. Va., July 5, 1955, K. V. Krombein (Townes).

34. Trachysphyrus albitarsis (Cresson)

Front wing 4.5 to 12.0 mm. long; lower half of frons with moderately strong transverse wrinkling; temple about 0.55 to 0.70 as long as eye, rather weakly convex; epomia long and strong; mesoscutum polished, with moderately large punctures that on the lateral lobes are separated by about 0.6 their diameter; mesopleurum of male with close, rather coarse punctures that on median part of mesopleurum are crowded; mesopleurum of female with rather coarse close punctures marginally, medially the punctation replaced by reticulate wrinkling; basal and apical transverse carinae of propodeum very close together, the apical carina forming a rather prominent sublateral crest; hind femur about 7.0 as long as deep in male, about 6.0 as long as deep in female; areolet narrowly pentagonal, the intercubiti strongly convergent; second recurrent vein rather strongly sinuate; ovipositor sheath about 0.68 as long as front wing; ovipositor about 4.0 as long from nodus to apex as it is deep at nodus.

This is a very common species over most of the United States and the southern half of Canada. Adults occur in sunlit grassy areas, usually where there are interspersed trees and shrubs. The species is divisible into four subspecies as keyed and described below:

1. Hind femur black 2
   Hind femur red 3
2. Scutellum of male with a median white spot; wings of female subhyaline to weakly infuscate; range: east of hundredth meridian except for parts of Canadian zone . . . . **34a. albitarsis albitarsis** (Cresson)
   Scutellum of male entirely black; wings of female moderately to strongly infuscate; range: Rocky Mountain area, Mexico, parts of Canadian zone in Eastern United States, and scattered localities within the ranges of the subspecies *mutatus* and *rufovinctus* . **34b. albitarsis argentifrons** (Cameron)
3. Hind coxa black; range: parts of the northwestern quarter of the United States and adjacent Canada . . . . . **34c. albitarsis mutatus** (Pratt)
   Hind coxa red; range: Pacific states and parts of Idaho, Nevada, Utah, and southern British Columbia . . . . **34d. albitarsis rufovinctus** (Pratt)

34a. Trachysphyrus albitarsis albitarsis (Cresson)

Ichneumon vinctus Say, 1829, Contr. Maclurian Lyceum Arts Sci., Philadelphia, vol. 1, p. 70 (Leconte ed., vol. 1, p. 375); ♂. Name preoccupied by Schrank, 1781. Type: ♂, Indiana (destroyed).

Ischnus albitarsis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 194; ♂. Type: ♂, Illinois (Philadelphia).

Cryptus americanus Cresson, 1864, Proc. Ent Soc. Philadelphia, vol. 3, p. 297; ♀. Lectotype: ♀, Illinois (Philadelphia).

Cryptus nigricalceatus Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 77; ♂. Type: ♂, Illinois? (destroyed in Chicago fire of 1871).

Cryptus nigricornis Provancher, 1874, Naturaliste Canadien, vol. 6, pp. 177, 201; ♂. Name preoccupied by Brullé, 1846. Lectotype: ♂, Quebec (Quebec).

Nematopodius coxatus Provancher, 1875, Naturaliste Canadien, vol. 7, p. 269; ♂. Type: ♂, Quebec (lost).

Hoplismenus impar Provancher, 1879, Naturaliste Canadien, vol. 11, p. 3 (Faune, p. 292); "♂"= ♀. Type: ♀, Quebec (Quebec).

Spilocryptus canarsiae Ashmead, 1897, Proc. Ent. Soc. Washington, vol. 4, p. 124; ♂. Type: ♂, Champaign, Ill. (Urbana).

Cryptus purneri Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 585. New name for *C. nigricornis*.

Male: Black. Orbit (broader in front, incomplete on lower part of temple and usually at top of temple), central part of face, front part of cheek, clypeus, mouth parts, front of scape, tegula, collar, hind corner of pronotum, usually more or less of upper margin of pronotum, often lower front edge of pronotum, subtegular ridge, more or less of scutellum, often postscutellum, and under side of front and middle coxae, white; front and middle first trochanters white, fuscous above; front and middle femora brown to fuscous, fulvous in front except near base, their apices whitish in front; front and middle tibiae and tarsi fulvous, the upper side of tibiae white, the tarsi whitish above except that apical segments are entirely brownish; hind tarsus usually with segments 2–4 white and sometimes base of segment 5 and apical part of segment 1 white; wings subhyaline; abdomen red, the base of first tergite often infuscate, the clasper and subgenital plate fuscous.

Female: Black. Orbit with a narrow whitish stripe in front and behind; palpi fuscous; tegula dark brown; subtegular ridge often brown; front femur apically in front, apex of middle femur in front,

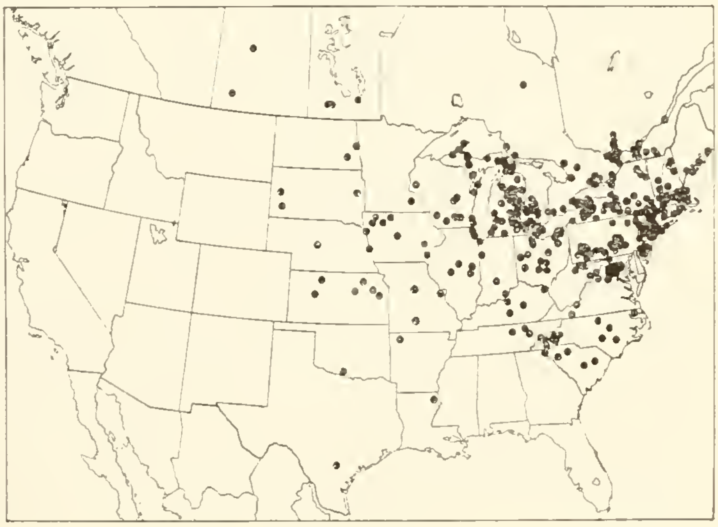


FIGURE 129.—Localities for *Trachysphyrus albitarsis albitarsis*.

front and middle tibiae, and front and middle tarsi brown; hind tarsus dark brown or fuscous, a little paler medially; wings faintly to weakly infuscate; abdomen red, the basal part of its first segment usually fuscous.

Specimens (650♂, 715♀): From Alabama; Arkansas (Bentonville); British Columbia (Fort Nelson); Connecticut (Canaan, Colebrook, Lyme, and New Haven); Delaware ("Woodkill"); District of Columbia (Washington); Georgia (Clayton); Illinois (Bloomington, Chicago, Mount Pulaski, North Chicago, and Rantoul); Indiana (Clark Co., Monroe Co., Newton Co., and Osborn); Iowa (Ames, Buffalo Center, Dickinson Co., Henry Co., Iowa City, O'Brien Co., Ruthven, and Sioux City); Kansas (Baldwin, Lawrence, Onaga, Phillipsburg, Riley Co., and Trego Co.); Kentucky (Green Co., Jefferson Co., Lexington, and Rock Haven); Louisiana (Tallulah); Maine (Bar Harbor, Casco Bay, Lincoln Co., Orrs Island, and Southport); Manitoba (Aweme, Spruce Woods, and Transcona); Maryland (Bowie, Cabin John, College Park, Glen Echo, Hagerstown, and Plummers Island); Massachusetts (Agawam, Beach Bluff, Boston, Brookline, Buckland, Cambridge, Cohasset, Forest Hills, Gloucester, Holliston, Humarock, Lancaster, Milton, Natick, Norfolk Downs, Petersham, South Hadley, Wellesley, West Newton, and Wollaston); Michigan (Alger Co., Ann Arbor, Altanta, Bay Co., Benton Harbor, Birmingham, Branch Co., Cheboygan, Clare Co., Detroit, Douglas Lake, East Lansing, Floodwood in Schoolcraft Co., Genesee Co., George Reserve in Livingtson Co., Gladwin Co., Goodrich, Gratiot Co., Gull Lake Biological Station in Kalamazoo Co., Houghton Co., Huron Co., Huron Mts. in Marquette Co., Ionia, Iosco Co., Isabella Co., Kalkaska Co., Keweenaw Co., Lapeer Co., 13 miles north of Lapeer, Mackinac Co., Mackinac Island, Macomb Co., Mason, Menominee Co., Mecosta Co., Midland Co., Missaukee Co., Monroe, Muskegon Co., Naubinway, Ogemaw Co., Ontonagon, Owosso, Roscommon Co., St. Claire Co., St. Ignace, Sanilac Co., Saginaw Co., Tecumseh, Warren Woods in Berrien Co., Watervliet, Wayne Co., and Yellow Dog Plains in Marquette Co.); Minnesota (Olmsted Co.); Missouri (Columbia, Mountain Grove, and Overland); Montana; Nebraska (Nebraska National Forest near Halsey and Omaha); New Brunswick (Caraquet, Nerepis, Newcastle, and Waweig); Newfoundland; New Hampshire (Conway, Franconia, Keene, and Pinkham Notch); New Jersey (Bambar in Ocean Co., Bridgeton, Camden, Clifton, Englewood, Fort Lee, Great Notch, Hammonton, Maurice River near Vineland, Middletown, Moorestown, New Brunswick, Palisades, Paterson, Rancocas Park, Riverton, Rutherford, Sandy Hook, Somerville, and Westfield); New York (Axton in the Adirondacks, Babylon, Bemus Point, Boston, Breesport, Buffalo, Canadarago Lake, Chafee, Cobleskill, Copake Falls, Coram, Fire Island, Flatbush, Fulton Co., Geneva, Gowanda, Grand Island, Great Kills on Staten Island, Greene Co., Hancock, Ithaca, Keene Valley in Essex Co., Kingston, Lake Sebago in Bear Mountain Park, Letchworth Park, Lockport, Long Beach on Long Island, Ludlowville, McLean Reserve in Tompkins Co., Medina, Middleport, New Dorp on Staten Island, New Rochelle, New Russia in Essex Co., New Windsor, New York, Niagara Falls, Olcott, Oneonta, Oswego, Peekskill, Penn Yan, Port Richmond on Staten Island, Poughkeepsie, Randolph, Ringwood in Tompkins Co., Rockaway on Long Island, Rock City in Cattaraugus Co., Roslyn, "Runda," Shokan, Slaterville, Slide Mt. at 2,800 to 4,000 ft., Stockport, Stony Island, Syracuse, Taughannock Falls, Thousand Islands, Tonawanda Indian Reserve in Genesee Co., Troy, West Farms in New York City, West Nyack, White Plains, and Yonkers); North Carolina (Aberdeen, valley of the Black Mts., Busick, Crabtree Meadows in Yancey Co. at 3,600 ft., Cranberry, Faison, Highlands, Indian Gap, Nance, Pineola, Raleigh, Swannanoa, and Winslow); North Dakota (Greenwood's slough near Grand Forks, Lincoln Park in Grand Forks, and Tower City); Nova Scotia (Hunter Creek near Baddeck, Kentville, and Truro); Ohio (Akron, Bedford, Cantwell Cliffs, Cleveland, Columbus, Fairfield Co., Fremont, Hardin Co., Hinckley, Jackson Township in Knox Co., Medina, Mendon, Montgomery Co., "Norway," Puritas Springs in Cuyahoga Co., Put-in-Bay, South Union Township in Ross Co., Sandusky, and Shaker Heights); Oklahoma (Waurika); Ontario (Ancaster, Batchawana, Bells Corners, Constance Bay, Echo Bay, Gananoque, Hastings Co., Jordan, Kearney, Leamington, Marmora, Niagara Glen, Orillia, Ottawa, Pelee Island, Point Pelee, Rockcliffe, Simcoe, Smoky Falls on the Mattagami River, Spencerville, Strathroy, St. Thomas, Trenton, Tweed, Vineland Station, and Waubamick); Pennsylvania (Allegheny Co., Carlisle, Carlisle Junction, Crisp, Harrisburg, Heckton Mills, Highspire, Hummelstown, Inglenook, Ingram, Jeanette, Kingsley, Lackawaxen, Linglestown, Mansfield in Tioga Co., Milford, Mount Holly Springs, New Cumberland, "North Park in Allegheny Co.," Ohiopyle, Overlook, Perdix, Pittsburgh, Presque Isle in Erie Co., Roberts Post Office, Rockville, Saltillo to 3 Springs, Sample Station in Allegheny Co., South Mountain, Tinicum, Wall, Washington Co., and West View); Prince Edward Island (Dalvay House in Canadian National Park); Quebec (Aylmer, Burbridge, Ile de Perrot, Gracefield, Granby, Hemmingford, Hull, Ile d'Orleans, Knowlton, Lanoraie, La Trappe, Maniwaki, Meach Lake, Montreal, Queen's Park in Aylmer, Ste. Anne des-Monts, St. Hilaire, Vaudreuil Co., and Wright); Rhode Island (Buttonwoods and Westerly); Saskatchewan (Rosthern and Swift Current); South Carolina (Clemson College, Columbia, Greenville, and Meredith); South Dakota (Brookings, Custer State Park, and Whitewood); Tennessee (Burrville, Chimneys Campground in Great Smoky Mts. National Park at 2,800 ft., Knoxville, and Lafollette); Texas (Beeville); Vermont (Dummerston and Woodstock); Virginia (Arlington, near Culpepper, Dayton, Falls Church, Galax, Glencarlyn, Great Falls, Mountain Lake Biological Station in Giles Co., Newington in Fairfax Co., Paeonian Springs, Pimmit Run, Rosslyn, Skyline Drive, and Vienna); West Virginia (Cheat Mt. in Randolph Co. at 2,000 ft., Jackson's Mill in Lewis Co., Lost River State Park in Hardy Co., Monongalia Co., and Terra Alta); and Wisconsin (Casco, Cranmoor, Gays Mills, Jefferson, Madison, Milwaukee, Montfort, Port Edwards in Wood Co., Racine, St. Croix Co., and Sturgeon Bay).

The species is adult from late spring to mid-fall, the males being most common in the earlier part of the season and the females most common in the later part. The typical habitat is in sunlit grassy and weedy areas with scattered trees and bushes. Males are usually seen flying between the grass and weed stems. Females fly among bushes and low vegetation and commonly alight on the ground. Sometimes they are seen in woods, exploring the surface litter. Sometimes they are on flowers. The series before us contains two lots labeled as collected on *Daucus carota* and two on *Pastinaca sativa*. Reared specimens are as follows: ♀, from a geometrid, Spruce Woods, Man., May 14, 1939. ♀, from *Grapholitha molesta*, Riverton, N.J., May 24, A. Peterson. ♂, from *Grapholitha molesta*, Middletown, N.J., Mar. 17, 1924, A. Peterson. ♂, from *Grapholitha molesta*, New Brunswick, N.J., Feb 18, 1924, A. Peterson. ♀, from *Heliothis zea*, Beeville, Tex., October 1895. ♀, from *Macronoctua onusta*, Ithaca, N.Y., fall of 1936, G. H. Griswold.

This subspecies occurs in the Carolinian and Alleghanian faunas.

34b. Trachysphyrus albitarsis argentifrons (Cameron)

Cryptus bicolor Smith, 1879, Descriptions of new species of Hymenoptera in the collection of the British Museum, p. 231; ♀. Name preoccupied by Lucas, 1846. Type: ♀, Irazu, 6,000 to 7,000 ft., Costa Rica (London).

Cryptus monticola Cameron, 1885, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 203; ♀. Name preoccupied by Wesmael, 1840. New synonymy. Type: ♀, Ciudad, 8,100 ft., Durango, Mexico (London).

Cryptus argentifrons Cameron, 1885, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 204; ♂. New synonymy. Type: ♂, Northern Sonora, Mexico (London).

Cryptus eggeri Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 569. New name for *Cryptus bicolor* Smith.

Cryptus coloradensis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 408; ♀. New synonymy. Type: ♀, "Powder River, Colo," (Washington).

Cryptus consobrinus Viereck, 1906. Trans. Amer. Ent. Soc., vol. 32, p. 225; ♀. Type: ♀, Oak Creek Canyon, 6,000 ft., Ariz. (Lawrence).

Cryptus inornatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 612; ♂, ♀. New synonymy. Type: ♀, Bozeman, 4,800 ft., Mont. (Washington).

Male: Black. Orbit broadly in front, narrow orbital stripes at top of eye and on temple, median spot on face, clypeus, front of scape, mandible, subtegular ridge, under side of front coxa and sometimes of middle coxa, and under side of first trochanter of front and middle legs, white; palpi mostly brown, the second segment of maxillary palpus white in front; tegula entirely white or more or less of its apical part brown; front and middle femora brown to fuscous, most of front femur and apical part of middle femur stramineous or whitish in front; front and middle tibiae brown or fuscous, white above; front and middle tarsi brown, the basal segments often whitish above; hind tarsus with all or most of segments 2–4, and often apex of segment 1, white; segment 5 of hind tarsus brown; wings subhyaline to weakly infuscate; segment 1 of abdomen black, its apical 0.25± red; second and following abdominal segments red; clasper and subgenital plate fuscous.

Female: Black. Orbit with a narrow whitish stripe in front and behind; front of front femur brown; tegula, front and middle tibiae and tarsi, and median segments of hind tarsus dark brown to blackish; wings moderately to strongly infuscate; abdomen red, the basal 0.5± of its first segment fuscous.

This subspecies intergrades with the subspecies *albitarsis* wherever their ranges are adjacent. In the Canadian zone of the East the intergradation is particularly gradual and the placement of specimens or populations is often arbitrary. For deciding borderline cases we use the characters in the key. The presence of a white spot on the scutellum of the male is rather easy to determine, but the question of how dark the wings of a female must be before it is classified as the subspecies *argentifrons* is more difficult. The subspecies becomes increasingly darker in coloration in the southern Rocky Mountains

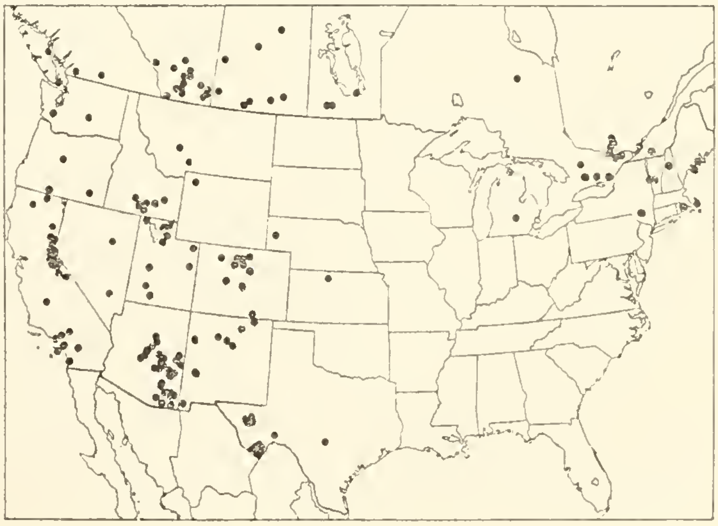


FIGURE 130.—Localities for *Trachysphyrus albitarsis argentifrons*.

and southward into Mexico. Specimens from those areas are of course very distinct from typical *albitarsis albitarsis*.

Specimens (232♂, 314♀): From Alberta (Beaverlodge, Brooks, Calgary, Cassils, Chin, Drumheller, Duchess, Elkwater, Elkwater Lake, Grimshaw, Lake Louise at 5,600 ft., Lethbridge, Manyberries, Medicine Hat, Scandia, Waterton, and Welling); Arizona (near Alpine, Bear Wallow on Mount Lemmon, Cave Creek Canyon near Southwest Research Station at 5,400 ft., Chiricahua Mts., Douglas, Fish Creek in Tonto National Forest, Flagstaff, Geronimo, Greer, Groom Creek, Hospital Flat on Graham Mt. at 9,000 ft., Huachuca Mts., Jerome, Mount Lemmon at 8,000 and 9,000 ft., 10 miles north of Nogales, Oak Creek Canyon, Parker Creek in Sierra Ancha, Peoples Valley 6 miles north of Yarnell, Pinecrest on Graham Mt., Pocket Creek in Sierra Ancha, Portal at 5,200 ft., near Roosevelt Lake, Rose Creek in Sierra Ancha, Rustlers Park in Chiricahua Mts. at 8,000 to 9,000 ft., San Francisco Mts., Southwest Research Station 5 miles west of Portal, White Mts., Willcox, and Workman Creek in Sierra Ancha); British Columbia (Agassiz, Courtenay, Oliver, and Victoria); California (Angora Lake near Tahoe, Apple Valley in San Bernardino Co., Avalon on Catalina Island, Big Flat on Coffee Creek in Trinity Co., Blanco's Corral on White Mt. in Mono Co. at 10,000 ft., Brockway, Costa Mesa in Orange Co., Crystal Lake in Los Angeles Co., Dardanelle, Devil's Basin at 8,200 ft., Donner Pass, Echo Lake in El Dorado Co., Exeter, Glen Alpine Creek near Tahoe, Hemet Reservoir in San Jacinto Mts., Hope Valley in Alpine Co., Leavitt Meadow in Mono Co., Mammoth, Markleeville, May Lake in Yosemite National Park at 10,500 ft., Mono Pass in Inyo Co., Mount Tallac near Tahoe, Sagehen near Hobart Mills, San Diego, Sonora Pass at 9,624 ft., and near Sonora Pass at 8,500 ft., Summit Camp in Lassen Co., West Walker River in Mono Co. at 6,000 ft., and Westwood Hills in Los Angeles Co.); Colorado (Ajax Mt. near Aspen at 11,300 ft., Boulder, Denver, near Estes Park, Florissant, Fort Collins, Longs Peak in Boulder Co., Masonville, Morley, "North Boulder Creek" in Boulder Co., and Steamboat Springs); Idaho (American Falls, Blackfoot, Oakley, 6 miles south of Rock Creek in Twin Falls Co., Rock Creek Ranger Station in Minidoka National Forest, and Tuttle); Kansas (Phillipsburg); Labrador (Cartwright and Mingan); Maine (Lincoln Co. and Orrs Island); Manitoba (Aweme, Spruce Woods Forest Reserve, and Teulon); Massachusetts (Harwichport); Michigan (Cheboygan Co. and East Lansing); Montana (Helena); Nebraska (Mitchell); Nevada (Alamo and Redhouse Ranch in Eureka Co.); New Brunswick (Caraquet and Waweig); Newfoundland (Harmon Field); New Hampshire (Bretton Woods); New Mexico (Cimarron Canyon in

Colfax Co., Jemez Springs, Pecos River in San Miquel Co., Pinedale, Pinos Altos Mts. in Grant Co., Raton, Rodeo, and Santa Fe); New York (Kiamesha [Lake] and Shelving Rock Brook near Lake George); Northwest Territories (Canol near Norman Wells, Fort Simpson, and Lake Ennadai Camp); Nova Scotia (Baddeck); Ontario (Bells Corners, Bobcaygeon, Gananoque, Norway Point on Lake of Bays, Ottawa, Smoky Falls on Mattagami River, and Tweed); Oregon ("Antelope Mt." in Harney Co. at 6,800 ft., Fish Lake in Steens Mts., Klamath Falls, and Sandy River south of Bend); Prince Edward Island (Brackley Beach in Canadian National Park); Quebec (Ellis Bay on Anticosti Island, Gracefield, Kazabazua, Kingsmere, Knowlton, Lanoraie, and Wright); Rhode Island (Bristol); Saskatchewan (Dodsland, Maple Creek, Qu'Appelle, Regina, Rock Glen, Saskatoon, White Fox, and Willow Bunch); Texas (The Basin at 5,000 to 6,000 ft., Boot Spring, Dogger Flats at 3,000 ft., Green Gulch, Headquarters, Oak Spring at 4,000 ft., Pine Canyon at 6,000 ft., Santa Elena at 2,100 ft., and Tornillo Flats at 2,500 ft., all in Big Bend National Park; Davis Mts., Kerrville, Limpia Canyon, McDonald Observatory at 6,000 ft., and Point of Rocks at 5,000 ft., all near Fort Davis; and Sanderson); Utah (Bear River Bay near Logan, Beaver, Delta, Farmington, Grand Co., Hyde Park, Jensen, Murray, Navajo Lake in Kane Co. at 9,000 ft., Park Valley, and "Pt. Mountain"); Vermont (Rutland); Washington (Centralia and Squaw Creek in Yakima Valley); Wyoming (Canyon Camp in Yellowstone National Park); and Mexico (Atlacomulco at 8,500 ft., Distrito Federal at 2,300 meters, 14 miles west of Huauchinango in Puebla, San Cristobel in Chiapas, Teotihuacan, and 20 miles north of Toluca at 8,500 ft.).

Collection dates are from mid-spring to mid-fall, but most are in May, June, July, and the first half of August. The earliest collection is January 19 at Westwood Hills, Los Angeles Co., Calif., and the latest is November 4 at Willcox, Ariz.

Among the material are five lots collected from flowers of *Pastinaca sativa.*

This subspecies occurs west of the hundredth meridian, in Mexico, and in parts of the Canadian zone of eastern North America. In British Columbia and the Pacific States it is largely, but not entirely, replaced by the subspecies *mutatus* and *rufovinctus.*

34c. Trachysphyrus albitarsis mutatus (Pratt), new status

Cryptus curticaudus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 627; ♀. New synonymy. Type: ♀, Crookston, Minn. (St. Paul).

Cryptus mutatus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 634; ♂, ♀. Type: ♀, Sun Creek Meadows, Crater Lake Park, Oreg., 6,500 to 7,000 ft. (Washington).

Male: Colored like the male of the subspecies *argentifrons* except that the hind femur is ferruginous. The white markings average a little more extensive than in *argentifrons*, the hind tibia and basitarsus vary from fuscous to fulvous, and the front and middle legs beyond the first trochanters average paler. Sometimes the front and middle legs are rather uniformly fulvous, without the front of the front femur and upper side of front and middle tibiae being definitely whitish. The hind basitarsus is not white apically, or only its extreme tip is whitish.

Female: Black. Orbit with a narrow whitish stripe in front and behind; median part of clypeus and front edge of mandible sometimes whitish; front and middle femora varying from fulvoferruginous to mostly fuscous, most of front part of front femur and middle femur apically in front, fulvous or brown; front and middle tibiae and tarsi brownish fulvous to brown; hind tibia and tarsus brown to fuscous; wings moderately to strongly infuscate; abdomen red, the basal half of its first segment sometimes partly infuscate.

Intergrades between this subspecies and *rufovinctus* or between it and *argentifrons* are not scarce. Most of the intergrades are from British Columbia and Idaho, where the range of *mutatus* overlaps those of *rufovinctus* and *argentifrons*. The intergrades have been classified with one of the three subspecies involved according to which of the three they resemble most closely. Thus a specimen with the hind femur red and the hind coxa mostly red but partly black is classified as the subspecies *rufovinctus*, and one with the hind coxa black and the hind femur fuscoferruginous, but more ferruginous than fuscous, is classified as the subspecies *mutatus*.

Specimens (27♂, 12♀): From Alberta (Waterton); British Columbia (Atlin at 2,200 ft., Kaslo, Robson, and Vernon); California (Big Flat on Coffee Creek in Trinity Co., Crane Flat in Yosemite National Park, Dardanelle, Mammoth Lake in Mono Co., May Lake in Yosemite National Park, Mount Tallac near Lake Tahoe, and Snow Flat in Yosemite National Park); Colorado (Steamboat Springs); Idaho (American Falls, Bancroft at 5,423 ft., Hansen, 5 miles north of Hazelton, 3 miles west of Juliaetta, Lewiston, Moscow, and Rupert at 4,157 ft.); Nevada (Caliente); South Dakota (Brookings); and Washington (Mount Rainier at 5,300 ft. and Pullman).

Collection dates are mostly from June 15 to August 10. Those outside of this range are: April 21 three miles west of Juliaetta, Idaho; May 21 on Coffee Creek, Big Flat, Trinity Co., Calif.; May 23 at Robson, B.C.; August 17 on Mount Rainier, 5,300 ft., Wash.; and August 18 at Rupert, 4,157 ft., Idaho.

This subspecies occurs mostly in the northwest corner of the United States and adjacent Canada. Specimens of it, however, are known from as far east as Minnesota and as far south as Colorado and central California.

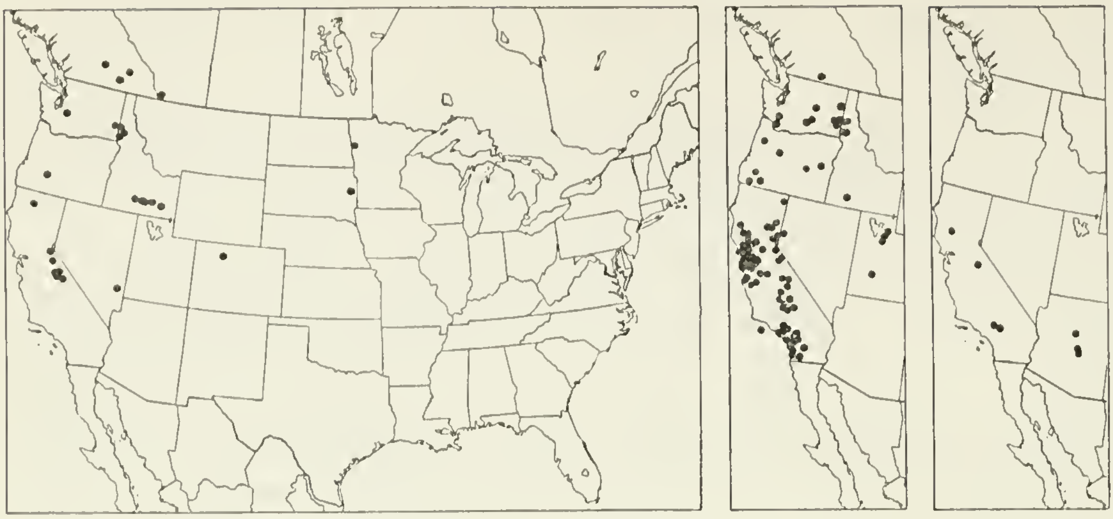
34d. Trachysphyrus albitarsis rufovinctus (Pratt), new status

Cryptus rufovinctus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 620; ♂, ♀. Type: ♀, Concord, Calif. (Washington).

Male: Black. Orbit in front (wide on face, narrow on frons), narrow orbital mark at top of eye (usually connected with orbital mark on frons), narrow stripe on temporal orbit, middle of face, clypeus, mandible, front of scape, hind corner of pronotum, subtegular ridge, and sometimes spot on scutellum, white; palpi fulvous; tegula whitish, its apical part more or less brownish; coxae and trochanters ferruginous, the front coxa, sometimes the middle coxa, and front and middle first trochanters white ventrally; front and middle legs beyond trochanters ferruginous, their fifth tarsal segments brown and often the front of front femur and upper edge of front and middle tibiae pale fulvous or whitish; hind femur and tibia ferruginous; segment 1 of hind tarsus fuscous or fuscoferruginous; segments 2–4 of hind tarsus whitish; segment 5 of hind tarsus brown, paler basally; wings with a weak brownish tinge; abdomen red, the clasper and subgenital plate fuscous.

Female: Black. Orbit whitish in front and behind; clypeus medially and most of mandible usually fulvous; palpi brownish fulvous; scape ferruginous, fuscous behind; collar, subtegular ridge, and often center of scutellum ferruginous; legs and abdomen red, the tarsi brownish apically; wings strongly infuscate.

Specimens (73♂, 173♀): From British Columbia (Oliver); California (Alameda, Antioch, 11 miles southwest of Bakersfield, Benicia, Berkeley, Bigpine, Bolinas, Borrego in San Diego Co., Brentwood, Bridge Creek Camp in Lassen Co., Buck's Lake in Plumas Co., Cache Creek Canyon in Yolo Co., Carlsbad, Carson Pass, Chile Bar in El Dorado Co., Concord, Costa Mesa, Danville, Davis, Earlimart, Famoso, Glendale, Hallelujah Junction in Lassen Co., Hastings Natural History Reserve near Jamesburg in Santa Lucia Mts., Hospital Canyon in San Joaquin Co., Huntington Lake in Fresno Co., Idria, Lake City, Lakeport, Little Lake, Lone Pine, Manteca in San Joaquin Co., Mill Valley, Monterey, Mount Diablo, 5 miles south of Mount Laguna P. O., Niles, Oakland, hills back of Oakland, Oxalis in Fresno Co., Pacific Grove, Palmdale, Palo Alto, Patterson, Pinecrest, Pleasanton, Putah Canyon in Napa and in Yolo Co., 4 miles west of Quincy, Redlands, Riverside, Rumsey, Sacramento, San Antonio Valley in Santa Clara Co., San Diego, San Luis Rey Camp in San Diego Co., San Jose, Santa Cruz Island, Shafter, Sierraville, Snow Creek near White Water at 1,500 ft., Stevens Creek Canyon in Santa



Figures 131–133.—Localities: 131 (left), *Trachysphyrus albitarsis mutatus;* 132 (center), *T. a. rufovinctus;* 133 (right), *T. rugifrons.*

Clara Co., Strawberry in Tuolumne Co., Tanbark Flat in Los Angeles Co., Three Rivers, Tolay Creek in Sonoma Co., Tracy, Vacaville, Vallejo, Ventura, Victorville on Mojave River, Walker Pass in Kern Co., Westley, Westwood Hills in Los Angeles Co., and Willits); Idaho (Clover in Twin Falls Co., Coyote Grade in Nez Perce Co., Lewiston, Moscow, and Troy); Nevada (Pyramid Lake); Oregon (Bend, Burns, Corvallis, Griffin Creek in Jackson Co., 4 miles east of Juntura at 1,440 ft., Roseburg, and Wilderville); Utah (Beaver, Farmington, Lehi, Murray, and "Pt. Mountain"); and Washington (Almota, Barnes State Park in Cowlitz Co., Felida in Clark Co., Harrah, Pullman, Spokane, Wawawai, Wenatchee, and Yakima).

Collection dates are distributed through the growing season, starting in March and continuing into November, the last date being December 4 at Davis, Calif.

Reared specimens are as follows: 2♂, from *Ramosia bibionipennis*, Burns, Oreg., June 12, 1919, B. G. Thompson. ♀, from *Sanninoidea exitiosa graefi*, San Jose, Calif., July 10, 1908, D. Moulton. ♀, from ?*Sanninoidea exitiosa graefi* in apricot, San Jose, Calif., June 6, 1908, D. Moulton. ♀, from *Sanninoidea exitiosa graefi*, San Jose, Calif., July 17, 1908, C. T. Paine. ♀, from *Sanninoidea exitiosa graefi*, Roseburg, Oreg., June 25, 1919, A. Burr Black. ♀, from *Sanninoidea exitiosa graefi*, Felida, Wash., Sept. 4, 1918, E. J. Newcomer. ♂, from *Trichoplusia*, Riverside, Calif., pupa collected Sept. 16, 1952, E. I. Dietrick. ♀, from *Etiella zinckenella*, Ventura, Calif., July 8, 1931, R. Cecil.

This subspecies ranges from southern British Columbia to southern California, eastward to Utah. It is the dominant form in Oregon and California.

35. Trachysphyrus rugifrons, new species

Front wing 7.3 to 9.0 mm. long. Structure similar to that of *T. albitarsis* except that transverse wrinkling on lower half of frons is coarse and strong, punctation of thorax is a little finer and weaker, and that tergites are subpolished, only weakly mat.

Male: Black. Orbits broadly white on face, less broadly white on frons; narrow orbital stripe at top of eye, another on temple, spot on center of face, clypeus except marginally, mandible, spot on front of scape, short mark on collar, small mark at lower end of epomia, hind corner of pronotum, subtegular ridge, and under side of front and middle coxae and first trochanters, white; palpi fulvous and whitish; tegula white, its apex fulvous or brown; second trochanters variously fulvous, fuscous, and white; front and middle legs beyond trochanters fulvous, their tibiae and basal tarsal segments often with narrow whitish markings above, the apex of tarsi brownish fulvous; hind femur fulvoferruginous; hind tibia and tarsus fulvous brown, the apical 0.4 of the first tarsal segment and all of segments 2–4 whitish; wings subhyaline; abdomen red, the clasper and subgenital plate fuscous, the seventh tergite infuscate apically.

Female: Black. Orbital stripe in front and behind, center of clypeus, and front edge of mandible, whitish; palpi fuscous; subtegular ridge ferruginous; second trochanters fuscous and ferruginous; legs beyond trochanters ferruginous, their tibiae and tarsi a little darkened and the front and middle femora often with fuscous striping; wings fuscous; abdomen red.

Type: ♂, Parker Creek, Sierra Ancha, Ariz., May 7, 1947, H. and M. Townes (Washington, USNM 63784).

Paratypes: ♀, Oak Creek Canyon, Ariz., May 18, 1947, H. and M. Townes (Townes). 8♂, Parker Creek, Sierra Ancha, Ariz., May 4, 7, and 9, 1947, H. and M. Townes (Townes). ♂, Workman Creek, Sierra Ancha, Ariz., May 6, 1947, H. and M. Townes (Townes). ♀, Camp Baldy, Los Angeles Co., Calif., June 26, 1950, H. F. Robinson (Davis). ♀, Crystal Lake, Los Angeles Co., Calif., June 29, 1950, P. D. Hurd (Townes). ♂, Lakeport, Calif., June 20, 1957, S. M. Fidel (Davis). ♂, Strawberry, Tuolumne Co., Calif., June 17, 1957, John M. Burns (Berkeley).

This species occurs in California and Arizona, in the damper parts of the Transition zone.

10. Genus Chromocryptus

FIGURE 313,a

Chromocryptus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 41. Type: (*Chromocryptus albopictus* Ashmead) = *planosae* (Fitch); original designation.

Mesostenimorpha Viereck, 1913, Proc. U.S. Nat Mus., vol. 44, p. 566. Type: (*Cryptus nebraskensis* Ashmead) = *planosae* (Fitch); original designation.

Front wing 4.3 to 6.2 mm. long; body proportions moderate; frons unarmed; clypeus moderately small and convex, its apical 0.35 somewhat impressed so that in profile the clypeus has the outline of a low pyramid; mesoscutum rather strongly convex, coarsely and closely punctate, its notaulus moderately sharp, reaching beyond the middle; epomia rather long and strong; propodeum with distinct dorsal and posterodorsal faces, its two transverse carinae strong, complete, rather close together, the apical carina forming strong but blunt sublateral crests; longitudinal carinae of propodeum vestigial in female, rather strong in male, the areola and median apical area weakly defined in female, clearly defined in male; propodeal spiracle subcircular; areolet pentagonal; ramellus rudimentary; nervulus a little basad of basal vein; mediella rather strongly arched basally, the rest weakly arched; nervellus broken near its lower 0.28; axillus close to anal margin; spiracle of first abdominal segment far beyond the middle, the postpetiole rather strongly expanded, moderately convex above; first tergite with a weak basolateral flange but without a distinct basolateral tooth; ventrolateral carina of first tergite sharp throughout; dorsolateral carina of first tergite complete but blunt; median dorsal carinae of first tergite faint but traceable to near middle of postpetiole; second tergite subpolished, its punctures coarse, strong, subadjacent; seventh tergite usually margined with white but without a white median spot; ovipositor sheath about 0.43 as long as front wing; ovipositor a little compressed, its tip slender, somewhat sagittate.

This genus is an aberrant offshoot of the genus *Trachysphyrus*. In our area it contains a single species. Some additional species in southern South America may be assignable to it. *Ichneumon bifasciator* Thunberg 1822 and *I. pulchratorius* Thunberg 1822 were assigned to *Chromocryptus* by Roman in 1912. Both of these belong in *Lymeon*, where they make new combinations.

Chromocryptus planosae (Fitch)

Front wing 4.3 to 6.2 mm. long; general structure and proportions as in figure 313,a, the head and body with rather coarse, close punctures and the propodeum rather strongly rugulose; second and third tergites with rather strong, close punctures.

This species is widespread in both North and South America. There are a number of subspecies. Two subspecies occur in the United States, one in Mexico, and three undescribed subspecies from Brazil and Argentina are in the Washington and Cambridge museums. The two Nearctic subspecies and the named Mexican subspecies are keyed and described below:

1. Propodeum and mesopleurum largely ferruginous, the rest fuscous and white; second and third tergites with poorly formed apical white bands or none; range: eastern United States . . . . . . **a. planosae planosae** (Fitch)
   Propodeum and mesopleurum not ferruginous, only black and white; second and third tergites with well developed apical white bands 2
2. Second and following tergites ferruginous with an apical white band; apex of hind femur and of hind tibia not infuscate; range: California.
   b. planosae vandykei, new subspecies
   Second and following tergites black with an apical white band; apex of hind femur and of hind tibia infuscate; range: Mexico.
   c. planosae mesorufus Cushman

a. Chromocryptus planosae planosae (Fitch)

Figure 331,d

Phygadeuon Planosae Fitch, 1856, Trans. New York State Agr. Soc., vol. 15, p. 501. Type: ♀, New York (Washington).

Cryptus nebraskensis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 412; ♀. Type: ♀, West Point, Nebr. (Washington).

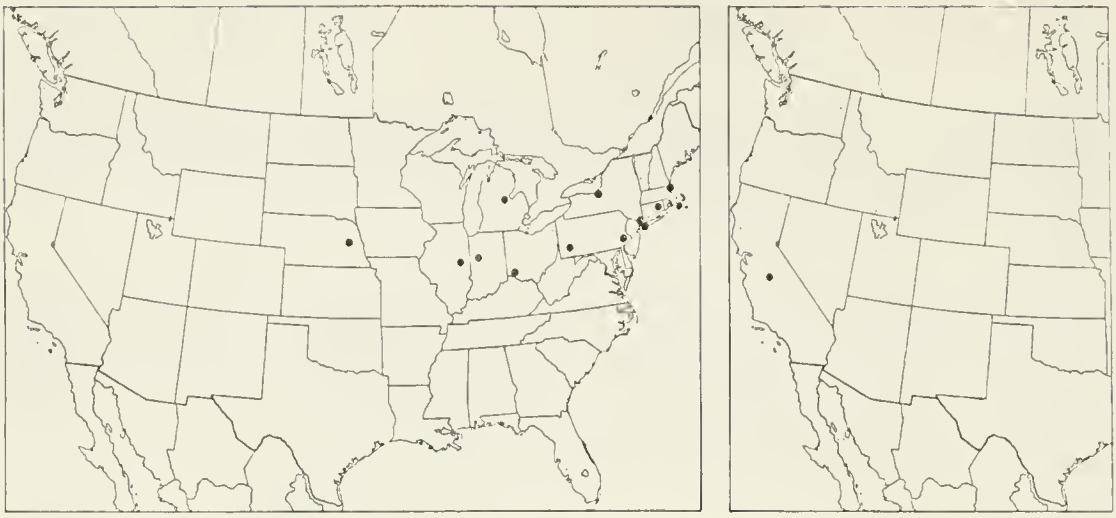
Chromocryptus albopictus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 41; [♀]. Type: ♀, Urbana, Ill. (Washington).

Agrothereutes (*Itamoplex*) *cressoni* Viereck, 1917, Bull. Connecticut Geol. Nat. Hist. Surv., vol. 22, p. 332; [♀]. Type: ♀, Connecticut (Philadelphia).

Male: Colored like female except that face is entirely white and flagellum entirely black.

Female: Head and body marked with black, white, and fulvous as in figure 331,d; palpi white; antenna blackish, the scape white in front and flagellum with an incomplete white band that covers about 6 segments; front and middle coxae and first trochanters white, the base of the coxae and upper side of the first trochanters fulvous; front and middle legs fulvous beyond the first trochanters; hind coxa, trochanters, femur, and tibia fulvous, the apex of tibia weakly infuscate; hind tarsus white, its fifth segment black and the basal 0.6± of its first segment fulvous to fuscous.

Specimens: ♂, reared from *Epicnaptera* sp., Windham, Conn., June 14, 1918 (St. Paul). ♀, Connecticut (Washington). 2♀, Lafayette, Ind., June 14, 1931, C. H. Kennedy (Columbus and Washington). ♂, 4♀, reared from *Epicnaptera* sp., Boxford, Mass., June 26 and July 5 and 10, 1922 (Washington and Ottawa). ♀, reared from *Tolype* sp., Martha's Vineyard, Mass., August 1925,



FIGURES 134, 135.—Localities: 134 (left), *Chromocryptus planosae planosae;* 135 (right), *C. p. vandykei.*

F. M. Jones (St. Paul). ♀, Midland Co., Mich., July 23, 1959 R. R. Dreisbach (Dreisbach). ♀, Farmingdale, N.Y., Aug. 7, 1938, H. and M. Townes (Townes). 2♀, reared from *Tolype velleda,* Long Island, N.Y., June 30, 1907, G. P. Engelhardt (Washington and Townes). ♀, reared from *Hallisidota tessellaris,* Rochester, N.Y., June 1932 (Washington). ♂, West Farms, New York City, N.Y., J. Angus (New York). 2♂, 2♀, reared from *Tolype velleda,* New York (Washington). 3♀, Montgomery Co., Ohio, Aug. 20, 1943, F. D. De Gant (Columbus and Townes). ♀, Ohio? (Columbus). ♀, "Olivet," J. C. B. (Cambridge). 5♂, reared from *Tolype velleda,* Obelisk, Pa., collected Nov. 18, 1909, emerged May 4 and 9, 1910 (Washington and Townes). ♂, Pittsburgh, Pa., July 5, 1912, H. Kahl (Pittsburgh). 2♂, 2♀, no locality, Moffatt (Ottawa).

This subspecies occurs in the Alleghanian fauna. It is rather frequently reared, as a gregarious parasite of *Tolype* and *Epicnaptera,* but very seldom collected.

b. Chromocryptus planosae vandykei, new subspecies

FIGURE 331,e

Male: Unknown.

Female type: Head and body black, white, and ferruginous as shown in figure 331,e; palpi white, darkened apically; scape brown with a white mark in front; pedicel and flagellum black, the flagellum with an incomplete white band that covers 3.2 segments; legs fulvoferruginous, the apices of the tarsi brownish.

Type: ♀, "Havilah," Fresno Co., Calif., May 16, 1930, E. C. Van Dyke (San Francisco).

c. Chromocryptus planosae mesorufus Cushman, new status

Chromocryptus mesorufus Cushman, 1930, Proc. U.S. Nat. Mus., vol. 76, art. 25, p. 2; ♀. Type: ♀, Cuernavaca, Mexico (Washington).

In color, this subspecies is much like *vandykei*, differing as stated in the key.

Specimen: ♀, 40 km. southeast of Puebla, Mexico, Dec. 30, 1940, G. E. Bohart (San Francisco).

11. Lanugo, new genus

Figure 313,b

Front wing 5.0 to 12.3 mm. long; body of moderate build to rather stout, mat (rarely subpolished) and with dense short hairs; frons unarmed; clypeus of moderate size, moderately to strongly convex, its apical margin truncate or arcuate, without a median tooth; mesoscutum moderately convex, strongly mat to subpolished or polished, its punctures dense or very dense; notaulus moderately strong to weak, usually reaching almost to center of mesoscutum; epomia long, rather strong; propodeum rather strongly convex, its transverse carinae strong, complete or the apical one weak or interrupted medially; apical transverse carina of propodeum forming very weak to moderately strong sublateral crests, mesad of the crests bowed or turned strongly forward; propodeal spiracle elongate; areolet pentagonal, its intercubiti rather strongly convergent and its front side shorter than mesal side; ramellus absent or rudimentary; nervulus opposite or a little basad of basal vein; mediella almost straight; nervellus broken near its lower 0.3; axillus close to anal margin; first abdominal segment with its spiracle far behind the middle, its postpetiole strongly expanded, rather strongly convex above; first tergite usually with a weak subbasal lateral tooth, its ventrolateral carina strong and sharp in females, usually absent in males, its dorsolateral carina usually complete but blunt in females, obsolete in males, its median dorsal carinae traceable in females to basal part of postpetiole but very blunt and faint; second tergite mat, with very dense fine punctures and short very dense hairs, especially in females; tergite 7 not marked with white; ovipositor sheath about 0.5 as long as front wing; ovipositor straight, compressed, its tip as in figures 329,b to 329,h.

The generic name is from the Latin word *lanugo*, meaning soft, downy hair, in reference to the fine, dense body hair characteristic of the genus.

Some of the species of this genus have formerly been included in *Compsocryptus*, to which they bear a superficial resemblance. *Lanugo* differs from *Compsocryptus* in having a moderately short, straight ovipositor rather than a longer upcurved one, axillus vein closer to anal margin of hind wing, front side of areolet narrower, and some less tangible characters in the head and thorax. The species parasitize hosts in rather dense cocoons on bushes or trees, in desert or dry places. The hosts of *Compsocryptus* are unknown, but are probably of a different kind, perhaps in the ground. It seems that the general resemblance of *Lanugo* to *Compsocryptus* is due partly to convergence.

The genus is best represented in Mexico. Some species occur as far south as Ecuador and a number are found in southwestern United States. A few are in the Southeast. One species (*brunnipennis*) ranges northward to British Columbia. The extralimital species which have been described are: *Cryptus fraternans* Cameron 1885 (Mexico), and *C. hebetis* Cameron 1885 (Mexico to Panamá). *Hemiteles ruficornis* Cameron 1886 (name preoccupied), which was renamed *H. rufiantennatus* by Dalla Torre in 1902, is the male of *hebetis* (new synonymy).

Keys to the Nearctic species of Lanugo

MALES

(Males of *schlingeri*, *cestus*, *longurius*, *bicincta*, and *polita* are unknown.)

1. Body and legs entirely black; wings yellow with only the apical margin fuscous (fig. 351) . . . . **10. flavipennis,** new species
   Body and legs largely or entirely fulvous or ferruginous; wings colored otherwise 2
2. Wings dark brown, not distinctly banded 3
   Wings hyaline to yellow, with more or less distinct brown or fuscous bands . 4
3. Third tergite ferruginous with its basal 0.3± blackish; front margin of pronotum with a moderately strong curvature at its lower 0.35.
   4. retentor (Brullé)
   Third tergite entirely ferruginous; front margin of pronotum with a small angulate projection at its lower 0.35 . . . **13. brunnipennis,** new species
4. Front edge of pronotum with at most a moderately strong curve at its lower 0.35; front wing subhyaline, with weak or rather strong brown or fuscous bands (figs. 342, 344, and 346) 5
   Front edge of pronotum with a small angulate projection at its lower 0.35, the angle about 85° to 120°; front wing yellow with rather strong brown bands (figs. 352 and 354) 7
5. Third tergite ferruginous with its basal 0.3± blackish; punctures on thorax a little finer and denser . . . . **3. ferrugata,** new species
   Third tergite entirely fulvous, its base not blackish; punctures on thorax a little coarser and sparser 6
6. Brownish cloud over nervulus extending on to hind end of basal vein (fig. 344); basal 0.28± of hind basitarsus fulvous; median whitish band on flagellum distinct and sharply defined . . . . **5. picta,** new species
   Brownish cloud over nervulus not extending on to hind end of basal vein (fig. 346); basal 0.6± of hind basitarsus fulvous; median pale band on flagellum often indistinct, sometimes lacking . . . **6. deserti,** new species

7. Third tergite entirely fulvous; propodeum without a median black stripe; upper 0.4 of mesepimeron fulvous: subterminal brown band on front wing usually not fused posteriorly with apical band (fig. 352).
11. excincta, new species

Third tergite with a basal blackish band; propodeum with a median longitudinal black stripe; upper 0.4 of mesepimeron black; subapical brown band on front wing fused posteriorly with apical band (fig. 354).
12. sororia (Cresson)

FEMALES

1. Body and legs entirely black; wings yellow with only the apical margin fuscous (fig. 351) . . . . **10. flavipennis,** new species

Body and legs largely or entirely fulvous or ferruginous; wings colored otherwise 2

2. Front wing almost uniformly dark brown 3

Front wing subhyaline or yellow, with brown bands 5

3. Third tergite with a black band on its basal 0.3±; mesoscutum dull, mat, and with very fine close punctures . . . . **4. retentor** (Brullé)

Third tergite uniformly ferruginous; mesoscutum shining, subpolished, with moderately fine, rather close punctures 4

4. Second tergite weakly mat, its punctures rather fine, separated by about 0.6 their diameter; front edge of pronotum with only a curvature at its lower 0.35; dorsal valve of ovipositor evenly tapered from nodus to tip (fig. 329,b) . . . . **1. schlingeri,** new species

Second tergite strongly mat, its punctures very fine, adjacent; front edge of pronotum with a small angular projection at its lower 0.35; dorsal valve of ovipositor distinctly depressed between nodus and tip.
13. brunnipennis, new species

5. Thorax shiny, polished and with small punctures; notaulus absent except for a broad faint depression; apex of upper valve of ovipositor abruptly tapered (fig. 329,f) . . . . **9. polita,** new species

Thorax dull, mat or subpolished and with fine or very fine punctures; notaulus distinct, though often short and weak 6

6. Front edge of pronotum with a small projecting angle at its lower 0.35, the angle 85° to 135° 7

Front edge of pronotum only curved at its lower 0.35, without a distinct angle 9

7. Second tergite entirely fulvous, not fuscous at base; tip of ovipositor exceptionally thick (fig. 329,g) . . . . **11. excincta,** new species

Second tergite with a fuscous band or a pair of transverse fuscous marks at base; tip of ovipositor more slender 8

8. Dorsal valve of ovipositor not depressed between nodus and apex, straight or weakly convex in profile; apical brown band on front wing weak, so that the front wing appears superficially to have only two brown bands.
8. bicincta, new species

Dorsal valve of ovipositor depressed and flattened between nodus and apex, weakly concave in profile (fig. 329,h); apical brown band on front wing moderately strong . . . . **12. sororia** (Cresson)

9. Front wing subhyaline with fuscous bands; body mostly ferruginous . . 10

Front wing yellow with brown bands; body mostly ferruginous or fulvous . 11

10. Second tergite not fuscous basally; mesoscutum weakly mat, its punctures moderately fine and dense . . . . **2. cestus** (Say)

Second tergite fuscous basally; mesoscutum strongly mat, its punctures very fine and dense . . . . **3. ferrugata,** new species

11. Tip of upper valve of ovipositor tapered abruptly (fig. 329,e). **7. longurius,** new species

Tip of upper valve of ovipositor tapered gradually (fig. 329,d) 12

12. Mesoscutum strongly mat and with fine, indistinct punctures; mesepimeron partly faintly infuscate to mostly black; wing bands stronger (fig. 345). **5. picta,** new species

Mesoscutum weakly mat and with fine, distinct punctures; mesepimeron not at all infuscate; wing bands weaker (fig. 347) . . **6. deserti,** new species

1. Lanugo schlingeri, new species

Figures 329,b; 340

Male: Unknown.

Female: Front wing 7.5 to 8.5 mm. long; hypostomal carina distad of the occipital carina rather high, about 0.45 as long as basal width of mandible, its apex moderately projecting beyond lower articulation of mandible; epomia about 0.38 as long as height of pronotum; front edge of pronotum with a weak curve at its lower 0.35; mesoscutum polished, its punctures small, rather weak, separated by about 0.6 their diameter; notaulus weak, extending about 0.33 the distance to scutellum; apical transverse carina of propodeum sharp, complete or its median 0.2 lacking, elevated sublaterally as a weak crest; second tergite weakly mat, with fine punctures that are separated by about their diameter; ovipositor tip as in figure 329,b.

Ferruginous. Flagellum brownish except near base; wings uniformly dark brown, as in figure 340.

Type: ♀, 4 miles west of Quincy, Calif., June 30, 1949, E. I. Schlinger (Washington, USNM 63785).

Paratype: ♀, 4 miles west of Quincy, Calif., June 26, 1949, W. R. Schreader (Townes).

2. Lanugo cestus (Say), new combination

Figure 341

Cryptus cestus Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 234 (Leconte ed. vol. 2, p. 691); ♀. Type: ♀, Indiana (destroyed).

Male: Unknown.

Female: Front wing 7.3 to 8.3 mm. long; hypostomal carina distad of occipital carina moderately high, 0.35 as long as basal width of mandible, weakly projecting beyond lower articulation of mandible; epomia 0.28 as long as height of pronotum; front edge of pronotum with a rather sharp curve at its lower 0.35; mesoscutum weakly mat, its punctures small, sharp, separated by about 0.3 their diameter; notaulus moderately sharp, reaching about 0.40 the distance to scutellum; apical transverse carina of propodeum sharp, its median 0.2 lacking, strengthened sublaterally to form a short crest; second tergite mat, with fine adjacent punctures; ovipositor tip about as in *L. retentor* (fig. 329,c), but the upper valve a little heavier and more convex in profile.

Ferruginous. Flagellum brownish, with a white band covering about 5.5 segments; most of prepectus, lower 0.65 of mesepimeron and surrounding area, groove at base of scutellum, median mark on mesosternum, edge of mesopleurum next to middle coxa, metasternum and its margins, and basal 0.35 of third tergite, black; hind tibia with a brownish tinge except basally; hind tarsus pale yellow, fulvous basally and apically; wings subhyaline, the front wing with fuscous bands as in figure 341, the apex of hind wing weakly infuscate.

Specimens: 2♀, Burrville, Tenn., July 6 and 11, 1953, Bernard Benesh (Ithaca and Townes). These specimens fit the original description perfectly and are the only specimens seen to date which could possibly be Say's "*Cryptus*" *cestus*.

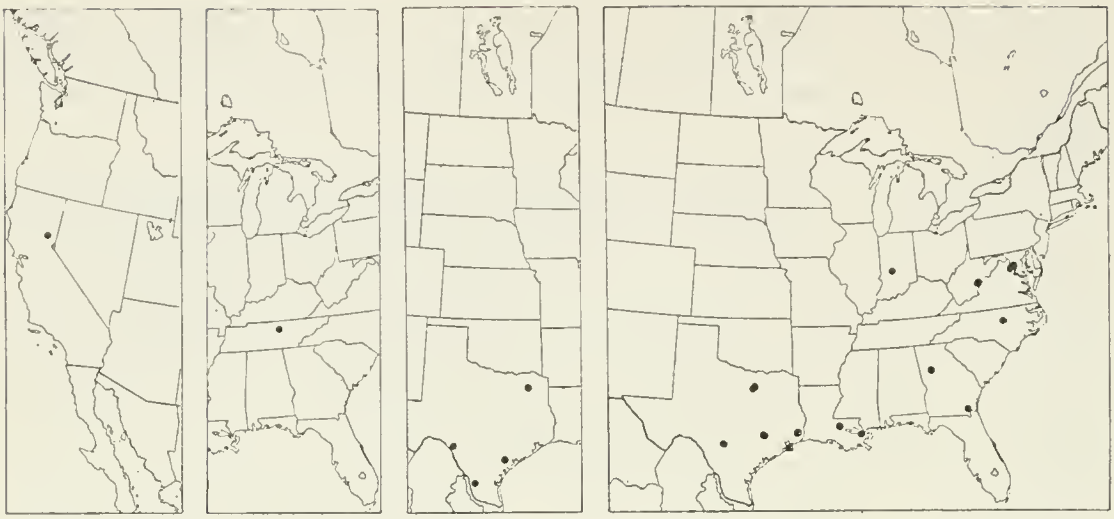
3. Lanugo ferrugata, new species

Figure 342

Male: Front wing 9.5 mm. long; mesoscutum subpolished, its punctures small, strong, separated by about 0.5 their diameter; apical transverse carina of propodeum strong, complete but indistinct medially; pleural carina complete below basal transverse carina, moderately strong; hypostomal carina, front edge of pronotum, and notaulus as in female.

Ferruginous. Basal 7 segments of flagellum fulvoferruginous below, infuscate above; segments 8–16 of flagellum pale yellow; segments 17 and following blackish; prosternum, prepectus, mesepimeron, and some sutural marks on thorax, black; front and middle tibiae yellow, fulvous below; tarsi yellow, their fifth segments brown, the basal half of fifth segment of hind tarsus yellow; wings colored as in female; first, second, fourth, and fifth tergites fuscous basally; basal 0.3 of third tergite fuscous.

Female: Front wing 8.7 to 11.5 mm. long; hypostomal carina distad of occipital carina rather high, about 0.58 as long as basal width of mandible, its apex weakly projecting beyond lower articulation of mandible; epomia about 0.20 as long as height of pronotum; front edge of pronotum with a rather sharp curve at its lower 0.35; mesoscutum mat, its punctures small, weak, separated by about 0.3 their diameter; notaulus moderately sharp, extending about 0.33 the distance to scutellum; basal transverse carina of propodeum sharp medially and laterally, elsewhere obsolescent (complete and sharp in all other Nearctic species); apical transverse carina of propodeum absent



FIGURES 136–139.—Localities: 136 (left), *Lanugo schlingeri;* 137 (center, left), *L. cestus;* 138 (center, right), *L. ferrugata;* 139 (right), *L. retentor.*

medially and laterally, sublaterally elevated as a short rather strong crest; second tergite strongly mat, with fine adjacent punctures; ovipositor tip as in *L. deserti* (fig. 329,d).

Ferruginous. Flagellum rather dark brown, especially apically, with a median whitish band covering about 5.5 segments; much or all of prepectus, more or less of mesepimeron and surrounding areas, and of grooves at bases of scutellum and propodeum, median mark on mesosternum, edge of mesopleurum next to middle coxa, metasternum and its margins, and basal 0.4± of third tergite, black; hind tarsus yellowish white, fulvous near base and apex; wings subhyaline, the front wing with fuscous bands as in figure 342, the apex of hind wing weakly infuscate; base of first abdominal segment sometimes partly infuscate; basal 0.2 to 0.45 of second tergite more or less infuscate.

Type: ♀, on *Salix* tree, Victoria, Tex., June 13, 1911, J. D. Mitchell (Washington, USNM 63786).

Paratypes: ♀, reared from pupa under bark of *Salix* tree, collected Dec. 24, 1915, emerged Apr. 2, 1916, Faries Ranch, Maverick Co., Tex., J. D. Mitchell (Washington). ♀, Hopkins Co., Tex., Oct. 22, 1939 (Townes). ♂, Victoria, Tex., May 2, 1910, J. D. Mitchell (Townes). ♀, Zapata Co., Tex., April 1936, S. Mulaik (St. Paul).

4. Lanugo retentor (Brullé), new combination

FIGURES 329,c; 343

Cryptus retentor Brullé, 1846, *in* Lepeletier, Histoire naturelle des insectes, hyménoptères, vol. 4, p. 192; ♀. Type: ♀, Carolina (Paris).

Cryptus comalensis Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 159; ♀. Type: ♀, Comal Co., Tex. (Philadelphia).

Cryptus nigripennis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 411; ♀. Type: ♀, New Jersey (Washington).

Male: Front wing 8.0 to 12.0 mm. long; mesoscutum subpolished, its punctures small, strong, separated by about 0.5 their diameter; apical transverse carina of propodeum absent medially, moderately strong laterally; pleural carina below basal transverse carina complete, moderately strong but rather irregular; hypostomal carina, front edge of pronotum, and notaulus as in female.

Ferruginous. Frontal orbit and mandible yellowish fulvous; basal 5 to 7 segments of flagellum fulvous, darker above; beyond the fifth to seventh segments of flagellum a pale yellow band, apicad of which the flagellum is blackish; occiput, prosternum, prepectus, mesepimeron except upper end, some sutural markings on thorax, often part or most of side and under side of thorax, and basal 0.3± of third tergite, black; coxae partly infuscate to mostly blackish; first trochanter of middle and hind legs more or less infuscate; front and middle tibiae yellow, fulvous below; tarsi yellow, their fifth segments brown, the basal 0.4± of fifth segment of hind tarsus yellow; wings colored about as in female but usually a little paler and with indistinct darker bands; base of first, second, and fourth tergites usually more or less infuscate.

Female: Front wing 8.5 to 11.5 mm. long; hypostomal carina distad of occipital carina rather high, about 0.55 as long as basal width of mandible, its apex weakly projecting beyond lower articulation of mandible; epomia about 0.30 as long as height of pronotum; front edge of pronotum with a moderate curve at its lower 0.35; mesoscutum mat, its punctures very small, weak, separated by about 0.3 their diameter; notaulus moderately sharp, reaching about 0.35 the distance to scutellum; apical transverse carina of propodeum sharp, obsolescent or weak medially and next to pleural carina, sublaterally making a moderately strong crest; propodeum wrinkled near to and apicad of its apical transverse carina; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in figure 329,c.

Brownish ferruginous. Flagellum dark brown, with a pale yellow band that covers about 6 segments; median part of occiput, marks on thorax of variable extent (including at least some of the deeper sutures and at most these plus most of propodeum and sides and under side of thorax), and basal 0.3± of third tergite, black; front coxa sometimes weakly infuscate; middle and hind coxae and trochanters faintly to strongly infuscate, sometimes largely blackish; hind tarsus yellowish fulvous, darker at base and apex; wings rather uniformly dark brown as in figure 343, the front wing often with faint darker banding; base of first abdominal segment and basal 0.3 of second tergite more or less infuscate.

Specimens: ♂, Florida (Ottawa). ♀, Atlanta, Ga., Sept. 20, 1946, P. W. Fattig (Townes). ♀, reared from cocoon of Megalopygidae, Billy's Island, Okefenokee Swamp, Ga., July 1912 (Ithaca). ♀, Spencer, Ind., June 26, 1925, J. A. Harris (St. Paul). ♀, Baton Rouge, La., H. A. Morgan (Washington). 2♀, "La. U.," La. (Washington). ♀, reared from *Lagoa pyxidifera*, New Orleans, La., May 22, 1958, J. C. Prichett (Washington). ♀, Raleigh, N. C., May 16, 1940 (Townes). ♂, Raleigh, N.C., Sept. 22, 1936, C. S. Brimley (Raleigh). ♂, Raleigh, N.C., Oct. 1, 1949, H. Townes (Townes). ♂, Raleigh, N.C., Oct. 4, 1935, C. S. Brimley (Raleigh). ♀, Beaumont, Tex., Mar. 18, 1908 (Washington). ♂, Brazos Co., Tex., Apr. 8, 1941, R. W. Strandtman (Townes). ♀, reared from *Megalopyge opercularis*, Dallas, Tex., Apr. 5, 1922 (Washington). ♀, reared from *Megalopyge opercularis*, Galveston Island, Tex., Jan. 17, 1955 (Washington). ♀, Plano, Tex., October, E. S. Tucker (Washington). 2♀, San Antonio, Tex., Apr. 1, 1955 (Washington). ♀, Fairfax, Va., Oct. 23, 1935, F. C. Craighead (Washington). ♀, Falls Church, Va., June 27, 1913, Wm. Middleton (Washington). ♀, Falls Church, Va., October 19, N. Banks (Cambridge). ♀, Cheat Mt., 2,000 ft., W. Va., June (Pittsburgh). ♂, reared from *Lagoa pyxidifera*, Oct. 20, 1880 (Washington). ♂, ♀, Feb. 13, 1905 (Ithaca).

This species occurs in southeastern United States. It is parasitic on the cocoons of Megalopygidae.

5. Lanugo picta, new species

FIGURES 344; 345

Male: Front wing 7.4 to 8.0 mm. long; mesoscutum polished, its punctures rather coarse, strong, separated by about 0.5 their diameter; apical transverse carina of propodeum moderately strong laterally, absent medially; pleural carina absent below basal carina or very weak and incomplete; hypostomal carina, front edge of pronotum, and notaulus as in female.

Fulvous. Front orbit and mandible yellowish; flagellum with a yellow band covering about 5 segments, basad of the band weakly infuscate above, apicad of the band fuscous; upper part of occiput, prosternum, prepectus, mesepimeron, and some sutural markings on thorax, black; tarsi yellow, their fifth segments brown and basal 0.28± of hind basitarsus fulvous; hind tibia dark ferruginous, its base a little paler; wings subhyaline, the front wing marked with fuscous brown as in figure 344, the apex of hind wing weakly infuscate.

Female: Front wing 7.3 to 12.8 mm. long; hypostomal carina distad of occipital carina moderately high, about 0.65 as long as basal width of mandible, its apex weakly projecting beyond lower articulation of mandible; epomia about 0.30 as long as height of pronotum; front edge of pronotum at its lower 0.35 with a weak to rather sharp curve; mesoscutum mat, its punctures very fine, weak, subadjacent; notaulus very weak anteriorly, stronger medially, extending about 0.33 the distance to scutellum; apical transverse carina of propodeum sharp, obsolescent, or weak medially and next to pleural carina, sublaterally making a moderately strong crest; propodeum wrinkled near to and apicad of its apical transverse carina; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in *L. deserti* (fig. 329,d).

Brownish ferruginous, or sometimes paler ferruginous. Flagellum dark brown, with a pale yellow band that covers 5 to 7 segments; often median part of occiput, more or less of thoracic sutures, and always basal 0.35± of third tergite black; tegula sometimes infuscate; front coxa and trochanters sometimes weakly infuscate; middle and hind coxae and trochanters usually more or less infuscate; hind femur and tibia fulvoferruginous to dark brown; hind tarsus pale fulvous, its fifth segment and basal 0.7± of first segment fulvous to dark brown; wings yellow, the front wing banded with brown as in figure 345, the hind wing brownish medially and apically; basal 0.6± of first abdominal segment and basal 0.3± of second abdominal segment more or less infuscate.

The female recorded below from the Santa Rita Mts., Ariz., has an unusually pale ground color (fulvoferruginous) and the fuscous or blackish markings unusually pale and restricted. It seems to represent a pale-colored race of southwestern United States.

Type: ♀, on grass, Brownsville, Tex., Jan. 21, 1954, Brown (Washington, USNM 63787).

Paratypes: ♂, Nogales, Ariz., Aug. 7, 1946 (Ottawa). ♂, 5 miles west of Portal, Chiricahua Mts., Ariz., Aug. 7, 1956, R. M. Bohart (Davis). ♀, Santa Rita Mts., 5,000 to 8,000 ft., Ariz., July, F. H. Snow (Townes). ♂, Austin, Tex., Apr. 12, 1902, A. L. Melander (St. Paul). ♀, The Basin, Big Bend National Park, Tex., May 29, 1959, H. F. Howden and E. C. Becker (Ottawa). ♂, Black Gap Refuge Headquarters in West Texas near Big Bend National Park, May 16, 1959, H. F. Howden and E. C. Becker (Ottawa). ♀, Corpus Christi Lake, Tex., March 28, 1952, D. J. and J. N. Knull (Columbus). ♂, Dugout Wells at 3,500 ft., Big Bend National Park, Tex., May 13, 1959, J. F. McAlpine (Ottawa). ♀, Dugout Wells at 3,000 ft., Big Bend National Park, Tex., May 13, 1959, W. R. M. Mason (Ottawa). ♂, ♀, Kerrville, Tex., April 5 and 16, 1959, W. R. M. Mason (Ottawa). ♂, Kerrville, Tex., April 4, 1959, H. F. Howden and E. C. Becker (Ottawa). ♀, "Neuecest," Tex., Apr. 26, 1896, Marlatt (Washington). ♀, Oak Spring at 4,000 ft., Big Bend National Park, Tex., May 2, 1959, H. F. Howden and E. C. Becker (Ottawa). ♀, Morelia, Mexico, R. and K. Dreisbach (Dreisbach). ♀, 17 kilometers southeast of Oaxaca, 1,610 m., Mexico, July 8, 1953, University of Kansas Expedition (Lawrence). ♀, Pueblo Nuevo, Chiapas, Mexico, Mar. 20, 1953, R. C. Betchel and E. I. Schlinger (Berkeley). ♀, 11 kilometers south of Tumbiscatio, Michoacan, Mexico, Dec. 1, 1950, Ray F. Smith (New York). ♂, ♀, Tuxpan, Michoacan, Mexico, July 11, 1951, H. E. Evans (Townes).

This species ranges from southern Texas to southern Arizona, and southward into Mexico.

6. Lanugo deserti, new species

Figures 329,d; 346; 347

Male: Front wing 5.3 to 7.4 mm. long; mesoscutum polished, its punctures moderately coarse, separated by about 0.6 their diameter; apical transverse carina of propodeum usually moderately strong laterally but sometimes almost absent, always absent medially; pleural carina absent below basal transverse carina, or very weak and incomplete; hypostomal carina, front edge of pronotum, and notaulus as in female.

Fulvous. Front orbit and mandible yellowish; flagellum sometimes entirely fuscous with a ferruginous tinge beneath, sometimes with a median yellowish band covering about 4 segments, basad of the band fulvous below and infuscate above, apicad of the band entirely fuscous, or often intermediate between the two color patterns described above; more or less of upper part of occiput, prosternum, prepectus, mesepimeron, and some sutural markings on thorax, black; tarsi yellowish, their fifth segments brown, the basal 0.6± of hind basitarsus more or less fulvous, often the hind tarsus largely or mostly brownish; wings subhyaline, the front wing with pale brown bands about as in *L. picta* but the bands paler and smaller, as in figure 346, the premedian brown band faint and covering only the nervulus; apex of hind wing weakly infuscate.

Female: Front wing 6.5 to 8.0 mm. long; hypostomal carina distad of occipital carina moderately high, about 0.65 as long as basal width of mandible, its apex weakly projecting beyond lower articulation of mandible; epomia about 0.28 as long as height of pronotum; front edge of pronotum with a weak curve at its lower 0.35; mesoscutum weakly mat, its punctures fine, sharp, separated by about 0.3 their diameter; notaulus very weak anteriorly, sharper medially, extending about 0.33 the distance to scutellum; apical transverse carina of propodeum sharp, obsolescent or absent laterally and medially, sublaterally strengthened to make a moderately strong crest; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in figure 329,d.

Fulvous. Flagellum brown, darker apically, with an indistinct median band of yellowish fulvous that covers 4 to 5 segments; sometimes the deepest thoracic sutures weakly infuscate but thorax otherwise uniformly fulvous; wings yellow, the front wing banded with brown as in figure 347, the apex of hind wing brownish; basal 0.2± of third tergite usually infuscate, especially sublaterally.

Type: ♀, Death Valley, Calif., April 1891, "K" (Washington, USNM 63788).

Paratypes: ♀, Canyon Lake on Apache Trail, Ariz., Apr. 16, 1947, H. and M. Townes (Townes). ♂, Chiricahua Mts., Ariz., July 16, 1959, D. J. and J. N. Knull (Columbus). ♀, Dripping Springs, Organ Pipe Cactus National Monument, Ariz., April 10, 1953, A. and H. Dietrich (Ithaca). ♀, Florence, Ariz., June 11, 1892 (Washington). ♀, near Roosevelt Lake, Ariz., Apr. 17, 1947, H. and M. Townes (Townes). ♂, Dry Canyon Sands Ranch at southeast end of Whetstone Mts., Cochise Co., Ariz., Aug. 10, 1952, H. B. Leech and J. W. Green (San Francisco). ♀, Borrego in San Diego Co., Calif., Apr. 9. 1941, R. M. Bohart (Townes). ♀, Cronise Valley in San Bernardino Co., Calif., Apr. 29, 1956, J. Powell (Berkeley). ♀, same data as type (Washington). 4♀, Death Valley, Calif., Apr. 28, 1950, D. Davis (Berkeley and Townes). ♂, ♀, Furnace Creek, Death Valley, Calif., Apr. 27, 1956, R. M. Bohart (Davis). ♀, Furnace Creek, Death Valley, Calif., Apr. 6, 1936, H. Hultgren (San Francisco). ♀, Furnace Creek, Death Valley, Calif., Apr. 8, 1939 (Townes). ♂, reared from a parasite of a saw fly on *Pinus*, Glendale, Calif., Aug. 7, 1948, E. I. Schlinger (Townes). ♂, Mount Diablo, Calif., Apr. 23, 1939, E. C. Van Dyke (San Francisco). ♀, Oro Grande, Calif., June 8, 1948, D. J. and J. N. Knull (Columbus). ♀, St. George, Utah, June 15, 1930, E. W. Davis (Washington).

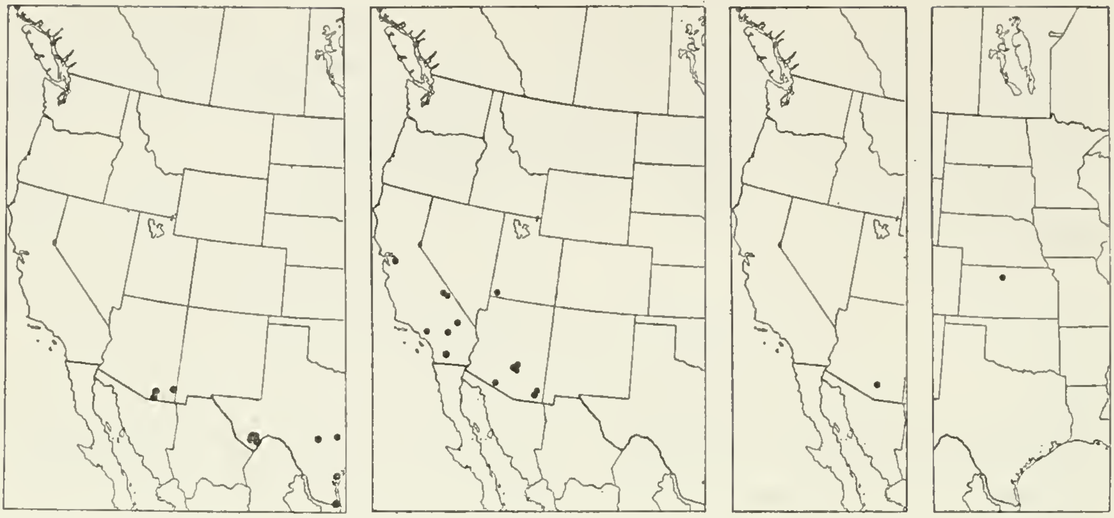
This species ranges from southern Utah and central California southward to the Mexican border. It occurs in desert or semidesert habitats.

7. Lanugo longurius, new species

FIGURES 329,e; 348

Male: Unknown.

Female type: Front wing 8.7 mm. long; hypostomal carina distad of occipital carina moderately high, 0.62 as long as basal width of mandible, its apex not projecting beyond lower articulation of mandible; epomia 0.36 as long as height of pronotum; front edge of pronotum at its lower 0.35 weakly curved; mesoscutum mat, its punctures very small, weak, separated by about 0.3 their diameter; notaulus rather sharp, extending 0.33 the distance to scutellum; apical transverse carina of propodeum sharp, obsolete near pleural carina, sublaterally making a distinct crest; second tergite strongly mat, with fine adjacent punctures; ovipositor tip as in figure 329,e, the upper valve beyond nodus not tapered until near point, then abruptly narrowed.



FIGURES 140–143.—Localities: 140 (left), *Lanugo picta;* 141 (center, left), *L. deserti;* 142 (center, right), *L. longurius;* 143 (right), *L. bicincta.*

Fulvoferruginous. Basal 4 segments of flagellum brownish fulvous, the next 5 segments pale yellow, brownish fulvous beneath, the rest of the segments brown; prosternum, front edge of prepectus except dorsally, and basal 0.25 of third tergite black, the black mark on third tergite not reaching sides of tergite; wings pale yellowish, the front wing with brown bands as in figure 348, the apex of hind wing pale brown.

Type: ♀, Sabino Canyon, Santa Catalina Mts., Ariz., July 12, 1932, R. H. Beamer (Lawrence).

8. Lanugo bicincta, new species

FIGURE 349

Male: Unknown.

Female type: Front wing 6.8 mm. long, the wings appearing a little reduced from normal size; hypostomal carina distad of occipital carina moderately high, 0.5 as long as basal width of mandible, weakly projecting beyond lower articulation of mandible; epomia 0.48 as long as height of pronotum; front edge of pronotum at its lower 0.35 with a weak angular projection; mesoscutum weakly mat, its punctures small, rather sharp, separated by about 0.4 their diameter; notaulus weak, reaching 0.2 the distance to scutellum; apical transverse carina of propodeum sharp, obsolete near pleural carina and medially, sublaterally making a distinct crest; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in *L. deserti* (fig. 329,d).

Fulvoferruginous. Flagellum brown, darker apically, segments 6–9 white above; wings yellowish, the front wing with brown bands as in figure 349, the apex of hind wing pale brown.

Type: ♀, Osborne, Kans. (Lawrence).

9. Lanugo polita, new species

Figures 329,f; 350

Male: Unknown.

Female: Front wing 8.2 to 8.7 mm. long; head and thorax unusually swollen in appearance, rather polished; hypostomal carina distad of occipital carina moderately high, about 0.35 as long as basal width of mandible, its apex weakly projecting beyond lower articulation of mandible; epomia about 0.25 as long as height of pronotum; front margin of pronotum at its lower 0.35 with a weak angular projection; mesoscutum polished, with small, weak punctures that are separated by about 0.3 their diameter; notaulus not distinct, represented anteriorly by a broad weak impression; basal transverse carina of propodeum absent in the middle 0.35 and near pleural carina, elsewhere moderately sharp, sublaterally making a weak crest; second tergite weakly mat, with very fine punctures that are separated by about their diameter; ovipositor tip as in figure 329,f.

Fulvous. Flagellar segments 5–9 yellowish fulvous, fulvous below, the tenth and following segments fulvous brown; front edge of sternal part of prepectus infuscate; suture at front edge of mesopleurum weakly infuscate; wings yellow, the front wing banded with brown as in figure 350, the apex of hind wing pale brown.

Type: ♀, Chiricahua Mts., Ariz., July 20, 1955, D. J. and J. N. Knull (Columbus).

Paratypes: 2♀, southern Arizona, J. Bequaert (Cambridge and Townes).

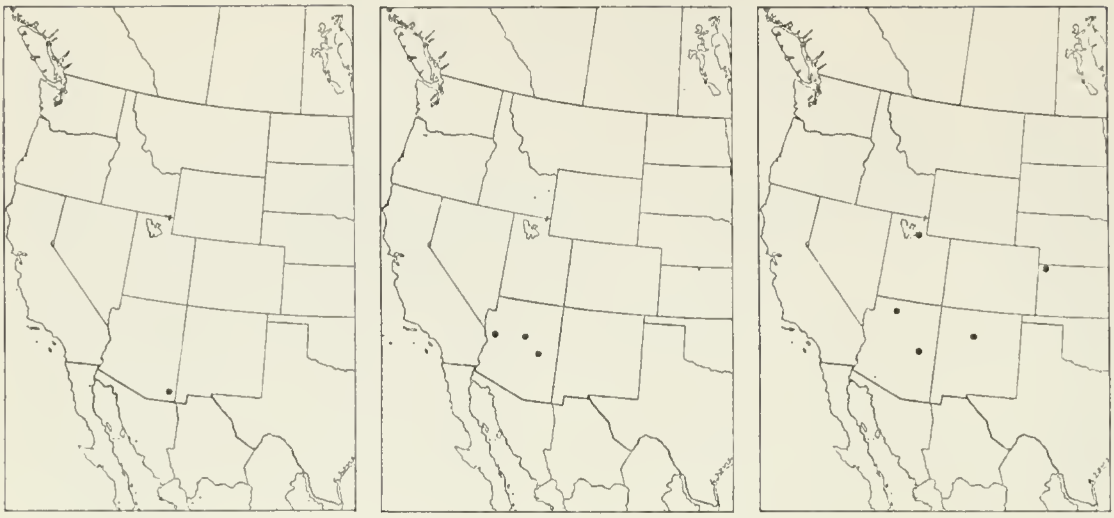
10. Lanugo flavipennis, new species

Figure 351

Male: Front wing 9.2 to 11.8 mm. long; mesoscutum polished, its punctures of moderate size, strong, separated by about 0.6 their diameter; apical transverse carina of propodeum moderately strong, obsolescent medially and next to side of propodeum; pleural carina absent below basal transverse carina; hypostomal carina, front edge of pronotum, and notaulus as in female.

Black, including antenna and legs. Wings orange yellow, the apical margin of front wing fuscous as in figure 351, the apex of hind wing weakly infuscate.

Female type: Front wing 10.5 mm. long; hypostomal carina distad of occipital carina rather high, 0.75 as long as basal width of mandible, its apex strongly projecting beyond lower articulation of mandible; epomia 0.44 as long as height of pronotum; front edge of pronotum at its lower 0.35 with a prominent angular projection, its apex making a 90° angle; mesoscutum subpolished, its punctures small, strong, subadjacent; notaulus weak, reaching 0.25 the distance



Figures 144–146.—Localities: 144 (left), *Lanugo polita;* 145 (center), *L. flavipennis;* 146 (right), *L. excincta.*

to scutellum; apical transverse carina of propodeum indistinct medially and laterally, elsewhere sharp, sublaterally strengthened to make a weak crest; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in *L. deserti* (fig. 329,d).

Black. Flagellar segments 5–10 pale yellow above, dark brown below, the base of fifth segment and apex of tenth segment dark brown; wings yellow, the apex of front wing fuscous, as in figure 351.

Type: ♀, Flagstaff, Ariz., July 7, Barber and Schwarz (Washington, USNM 63789).

Paratypes: ♂, Parker Creek, Sierra Ancha, Ariz., May 9, 1947, H. and M. Townes (Townes). ♂, Walapai Mts., Ariz., June 1941, Ernestine Hall (Townes).

11. Lanugo excincta, new species

Figures 329,g; 352; 353

Male: Front wing 9.5 to 11.5 mm. long; mesoscutum polished or subpolished, its punctures moderately small, strong, separated by about 0.5 their diameter; apical transverse carina of propodeum moderately strong but irregular, sometimes indistinct or absent medially; pleural carina below basal carina complete or almost complete, sometimes irregular; hypostomal carina, front edge of pronotum, and notaulus as in female.

Fulvous. Front orbit and mandible yellowish; flagellum with a poorly defined yellowish fulvous band covering about 7 segments, basad of the band fulvous with its upper side weakly infuscate, apicad of the band dark brown; most of occiput, lower 0.7± of front part of prepectus, lower 0.6± of mesepimeron and adjacent sclerites, and sutural markings around scutellum and base of propodeum, black; hind tibia ferruginous; tarsi yellow, their fifth segments fulvous brown, the basal 0.2± of hind basitrsus usually fulvous; wings yellow, the front wing with brown bands as in figure 352, the apex of hind wing brownish.

Female: Front wing 10.3 to 11.3 mm. long; hypostomal carina distad of occipital carina very high, about 0.3 as long as basal width of mandible, its apex strongly projecting beyond lower articulation of mandible; epomia about 0.50 as long as height of pronotum; front edge of pronotum at its lower 0.35 with a prominent angular projection, the apex of the projection about 90°; mesoscutum weakly mat, its punctures small, sharp, separated by about 0.3 their diameter; notaulus rather sharp, reaching about 0.35 the distance to scutellum; apical transverse carina of propodeum weak or obsolescent medially and laterally, elsewhere sharp, sublaterally forming a weak crest; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in figure 329,g, rather heavy, the upper valve rather broad and rounded above.

Fulvous. Apical 0.4± of flagellum brownish fulvous; flagellum sometimes with a very faint, median, yellowish fulvous band; head, body, and legs without fuscous markings; hind tarsus yellowish, fulvous basally and apically; wings yellow, the front wing banded with brown as in figure 353, the apex of hind wing pale brown.

Type: ♀, "Chenney Glh.," Colo., July 22 (Washington, USNM 63790).

Paratypes: ♂, Grand Canyon, 7,000 ft., Ariz., June 5, 1940, R. M. Bohart (Townes). 2♂, Parker Creek, Sierra Ancha, Ariz., May 9, 1947, H. and M. Townes (Townes). ♀, same data as type (Townes). ♀, Cheyenne Co., 3,600 ft., Kans., F. X. Williams (Lawrence). ♂, Jemez Springs, N. Mex., July 21, 1921, J. P. Engelhardt (Washington). ♂, Farmington, Utah, June to July 1944, G. E. Bohart (Townes).

This species is known from western Nebraska, northern Utah, and the Transition zone of New Mexico and Arizona.

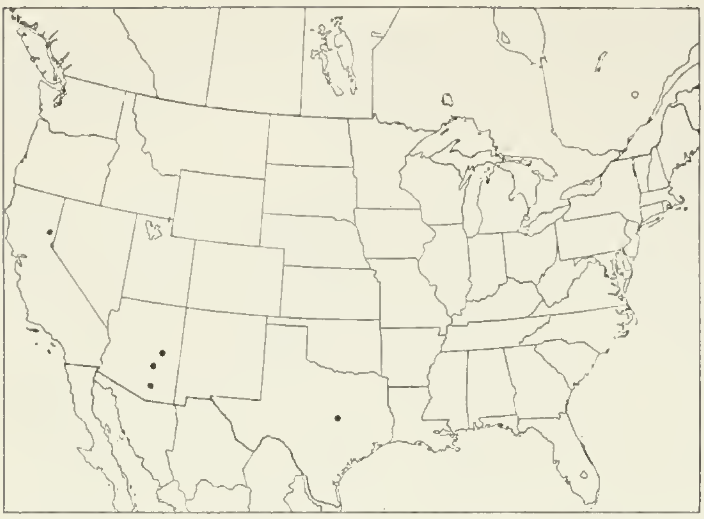
12. Lanugo sororia (Cresson), new combination

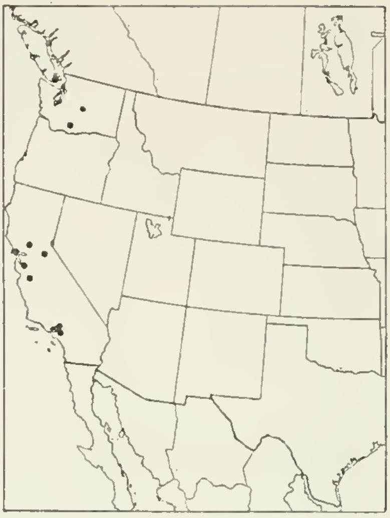
FIGURES 329,h; 354; 355

Cryptus sororius Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 159; "♂"= ♀. Lectotype: ♀, Bosque Co., Tex. (Philadelphia).

Male: Front wing 8.7 to 9.8 mm. long; pleural carina below basal transverse carina of propodeum absent or weak and irregular; structure otherwise as in male of *L. excincta*.

Fulvous. Front orbit and mandible yellowish; flagellum with a fulvous band covering about 5 segments, basad of the band fulvous with its upper side fuscous, apicad of the band fuscous; cheek at upper





FIGURES 147, 148.—Localities: 147 (left), *Lanugo sororia;* 148 (right), *L. brunnipennis.*

articulation of mandible, lower median part of frons, occiput, prosternum, prepectus, mesepimeron, median longitudinal stripe on propodeum, various sutural markings on thorax, sclerotized part of under side of first abdominal segment, and basal 0.3± of third tergite, black; base of tergites 4–6 sometimes fuscous; tarsi yellowish fulvous, their fifth segments brownish fulvous and basal 0.4± of hind basitarsus fulvous; wings yellow, the front wing banded with brown as in figure 354, the apex of hind wing brownish.

Female: Front wing 9.7 to 11.5 mm. long; hypostomal carina distad of occipital carina moderately high, about 0.3 as long as basal width of mandible; epomia about 0.33 as long as height of pronotum; front edge of pronotum at its lower 0.35 with a prominent angular projection, the apex of projection about 90°; mesoscutum weakly mat, its punctures small, sharp, separated by about 0.3 their diameter; notaulus rather sharp, reaching about 0.35 the distance to scutellum; apical transverse carina of propodeum weak or obsolescent medially and laterally, elsewhere sharp, sublaterally forming a weak crest; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in figure 329,h, the upper valve depressed and flattened between nodus and apex.

Fulvous. More or less of central part of occiput and deeper thoracic sutures black; basal 4 segments of flagellum fulvous brown, the next 5 segments pale yellow, fulvous brown below, the rest of flagellum dark brown; wings yellow, the front wing banded with brown as in figure 355, the apex of hind wing pale brown; hind tibia brownish fulvous apically; hind tarsus yellow, fulvous basally and apically; basal 0.25± of third tergite blackish, the blackish mark not reaching sides of tergites and narrowed or interrupted medially.

Specimens: 3♂, 2♀, Parker Creek, Sierra Ancha, Ariz., Apr. 25 and May 7, 9, and 11, 1947, H. and M. Townes (Townes). ♂, near

Roosevelt Lake, Ariz., Apr. 23, 1947, H. and M. Townes (Townes). ♀, southern Arizona, J. Bequaert (Cambridge). ♀, Tucson, Ariz., Mar. 27, 1947, A. G. Chermock (Ottawa). ♀, Tucson, Ariz., April 1897, A. Koebele (San Francisco). ♀, Portola, Calif., July 20, 1910, F. E. Blaisdell (San Francisco). ♂, ♀, Texas, Belfrage (Washington). ♂, Texas (Washington). ♀, Zacatecas, Zacatecas, Mexico, M. Cazier, W. Gertsch, and Bradts (New York).

This species is known from California, Arizona, Texas, and Mexico.

13. Lanugo brunnipennis, new species

FIGURE 356

Male: Front wing 8.7 to 12.3 mm. long; mesoscutum polished or subpolished, its punctures medium sized, strong, separated by about 0.3 their diameter; apical transverse carina of propodeum moderately strong, sometimes weak or absent medially; pleural carina below basal transverse carina complete or incomplete, moderately strong; hypostomal carina, front edge of pronotum, and notaulus as in female.

Ferruginous. Sometimes small areas on frons above antennal sockets, much or most of occiput, and sutural markings on thorax (often including entire prepectus), black; flagellum fuscous, usually with a poorly defined median fulvous band, its basal 0.65± fulvous below; tarsi yellowish or fulvous, their fifth segments brown, the basal 0.4± of hind basitarsus more or less fulvous; wings rather uniformly dark brown.

Female: Front wing 9.3 to 10.3 mm. long; hypostomal carina distad of occipital carina very high, about 0.45 as long as basal width of mandible, its apex strongly projecting beyond lower articulation of mandible; epomia about 0.40 as long as height of pronotum; front edge of pronotum at its lower 0.35 with an angular projection, the apex of the angle about 90°; mesoscutum weakly mat, its punctures small, sharp, separated by about 0.3 their diameter; notaulus rather sharp, reaching about 0.35 the distance to scutellum; apical transverse carina of propodeum complete and sharp or obsolescent medially and laterally, sublaterally strengthened to form a weak crest; propodeum near its apical carina with rather strong wrinkles; second tergite strongly mat, with fine, adjacent punctures; ovipositor tip as in *L. sororia* (fig. 329,h), the upper valve depressed and flattened between nodus and tip.

Fulvoferruginous. Basal 4 segments of flagellum fulvous brown, the next 5 segments pale yellow, fulvous brown below, the rest of flagellum medium brown; hind tarsus yellowish fulvous, the fifth segment and basal 0.7± of first segment fulvous; wings uniformly dark brown, as in figure 356.

Type: ♀, Westwood Hills, Los Angeles Co., Calif., Aug. 4, 1935, E. G. Linsley (Washington, USNM 63791).

Paratypes: ♂, Victoria, B.C., May 31, 1919, W. Downes (Ottawa). ♂, ♀, B.C. (Ottawa). ♂, Camino, Calif., June 27, 1948, H., M., G., and D. Townes (Townes). ♂, Camp Baldy, Los Angeles Co., Calif., July 11, 1950, P. D. Hurd (Townes). ♀, Crystal Lake, Los Angeles Co., Calif., June 29, 1950, H. F. Robinson (Davis). ♂, Mill Valley, Marin Co., Calif., June 19, 1950, H. B. Leech (San Francisco). ♀, Paraiso Springs, Calif., May 6, 1928, L. S. Slevin (San Francisco). ♀, Elm tree on Putah Creek [Calif.], October 1942 (Townes). ♂, San Jose, Calif., June 6, 1942, H. Madison (Berkeley). ♂, Tanbark Flat, Los Angeles Co., Calif., July 11, 1932, R. M. Bohart (Davis). ♂, Kittitas Co., Wash., July 22, 1934 (Townes). ♂, Signal Peak, Wash., July 4, 1930, A. R. Holfs (Washington). ♂, Sept. 5 (Washington). 2♂, no data (Washington).

This species ranges from southern British Columbia to southern California.

12. Reptatrix, new genus

FIGURE 314,a

Front wing 5.7 to 6.8 mm. long; body moderately stout, rather depressed; frons unarmed; clypeus about 2.8 as wide as long, almost flat, its apex a little reflexed, its apical margin weakly convex, with a faint median lobe; mandible about 3.2 as long as it is wide at the middle, its upper tooth a little longer than lower tooth; subapical part of female flagellum a little widened, and flattened below (cylindric and not widened in all other Nearctic genera except *Joppidium* and some species of *Compsocryptus*); mesoscutum moderately convex, polished, with moderately coarse, rather distant punctures; notaulus weak, not reaching quite to center of mesoscutum; epomia absent; propodeum rather strongly convex, its transverse carinae complete and sharp, the apical carina not forming sublateral crests; propodeal spiracle long elliptic; areolet moderately large, pentagonal, its sides rather strongly convergent; ramellus present; nervulus approximately opposite basal vein; mediella very weakly arched; nervellus broken far below the middle; axillus close to anal margin; first abdominal segment rather stout, rather strongly widened toward apex, its spiracle near its apical 0.44, its base without a distinct basolateral tooth, its ventrolateral carina sharp throughout, its dorsolateral and median dorsal carinae blunt and rather indistinct, the latter reaching basal part of postpetiole; second tergite weakly mat, its punctures fine, separated by about the length of the hairs in female, somewhat closer in male; seventh tergite not marked with white; ovipositor sheath about 0.40 as long as front wing; ovipositor moderately compressed, its tip sagittate.

Type: *Cryptus crassipes* Pratt.

The generic name is from the Latin *reptatrix,* a creeper. Judging from its general structure, the female does more crawling than the females of related genera.

There is a single species of the genus in our area. Some undescribed species from Mexico may be assignable to it.

1. Reptatrix crassipes (Pratt), new combination

Cryptus crassipes Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 585, ♀. Type: ♀, Carrville, Trinity Co., Calif., 2,400 to 2,500 ft. (San Francisco).

Front wing 5.7 to 6.8 mm. long. General structure as in figure 314,a. Frons polished, with moderate sized, sharp punctures that are separated by about 1.3 their diameter in the female, larger and more crowded in the male; mesopleurum polished, with moderate-sized, sharp punctures that are partly confluent with and replaced by longitudinal wrinkling.

Male: Black. Face, clypeus, front part of cheek, sometimes spot or short stripe on frontal orbit, mouth parts, front of scape, tegula, and often the subtegular ridge, yellow; flagellum fulvous brown below; hind corner of pronotum, sometimes part of lower edge of pronotum, and sometimes scutellum, fulvous; legs fulvous, the front coxa and trochanters, more or less of middle coxa, much or all of middle trochanters, and first four segments of all tarsi, yellow; wings with a brown tinge; abdomen fulvous, black beyond sixth segment.

Female: Black. Middle of face, clypeus, and mandible ferruginous; palpi, scape except above, legs, and abdomen, fulvoferruginous; wings with a brown tinge.

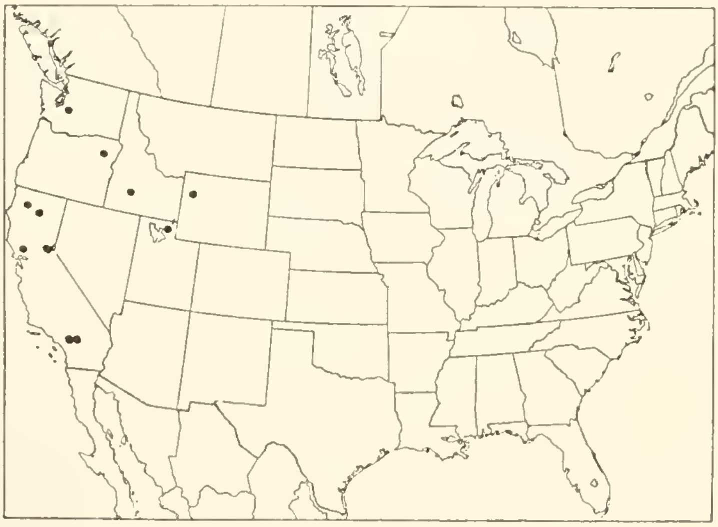


FIGURE 149.—Localities for *Reptatrix crassipes.*

Specimens: ♂, Big Flat, Coffee Creek, Trinity Co., Calif., June 21, 1934 (Townes). ♂, Old Station, Shasta Co., Calif., June 15, 1941 (Berkeley). ♂, Samuel Spring, Napa Co., Calif., June 21, 1955, D. L. Dahlsten (Davis). ♂, Tamarack Lake, 7,700 ft., Calif., July 19, 1931, E. O. Essig (Berkeley). ♂, Tanbark Flat, Los Angeles Co., Calif., June 17, 1956, R. M. Bohart (Townes). ♂, "Tetley Park," San Bernardino Mts., Calif., May 11, 1941, E. C. Van Dyke (San Francisco). ♂, Dixie, Elmore Co., Idaho, June 17, 1957, W. F. Barr (Townes). ♀, Baker Co., Oreg., June 23, 1922, L. R. Dice (Ann Arbor). ♂, Logan Canyon, 5 miles east of Logan, Utah, June 11, 1955, G. E. Bogart (Moscow). ♂, Mount Rainier, 2,900 ft., Wash., July 28, 1940, H. and M. Townes (Townes). 2♀, Jackson Hole, Grand Tetons, Wyo., June 28, 1938, E. C. Van Dyke (San Francisco and Townes).

This species occurs in western United States, in the Transition and Canadian zones.

13. Genus Compsocryptus

FIGURE 314,b

Cryptoideus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 42. Type: *Cryptus purpuripennis* Cresson; original designation.

Compsocryptus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 43. Type: *Cryptus calipterus* Say; original designation.

Callicryptus Ashmead, 1900 Proc. U.S. Nat. Mus., vol. 23, p. 43. Type: (*Cryptus "fasciatus"* (!) Brullé) = *fasciipennis* (Brullé); original designation.

Stictocryptus Cameron, 1908, Trans. Amer. Ent. Soc., vol. 34, p. 243. Name preoccupied. Type: (*Cryptus fasciatipennis* (!) Brullé) = *fasciipennis* (Brullé); original designation.

Front wing 7.2 to 13.0 mm. long; body of moderate proportions; frons unarmed; clypeus moderately large, rather weakly convex, its apex broadly truncate or weakly convex, without a median tooth; subapical part of female flagellum usually a little widened and weakly flattened below (cylindric and not widened in all other Nearctic genera except *Reptratrix* and *Joppidium*); mesoscutum rather strongly convex, mat, with fine, very dense punctures; notaulus weak, not reaching center of mesoscutum; epomia rather weak; propodeum rather strongly convex, its basal transverse carina sharp, blunt, or sometimes absent, its apical transverse carina moderately strong, obsolete medially, or rarely absent, usually forming weak sublateral crests; propodeal spiracle elongate; wings brown or banded with yellow and brown or black and yellow; areolet moderately large, pentagonal, rather wide, its front side about as long as mesal side; ramellus absent; nervulus opposite basal vein; mediella almost straight; nervullus broken well below the middle; axillus long, divergent from anal margin, about as close to submediella as to anal margin; first abdominal segment without a distinct basolateral tooth, its spiracle far behind the middle, its postpetiole strongly expanded, its ventrolateral carina sharp and complete, its dorsolateral and median dorsal carinae blunt and indistinct, the latter reaching basal part of postpetiole; second tergite mat, with fine dense punctures, denser in females than in males, in females of some species the punctures sparser on central part of tergite; tergite 7 not marked with white; ovipositor sheath about 0.5 to 1.4 as long as front wing; ovipositor cylindric, weakly upcurved, its tip elongate, about 4.0 to 10.0 as long from nodus to apex as it is deep at nodus.

Compsocryptus is an American genus, ranging from southwestern Canada to southern Argentina. The majority of the species occur in Mexico and southwestern United States. Fourteen species are in our area, of which one occurs also in Cuba and several range southward into Mexico. Besides these, we have studied *Cryptus xanthostigma* Brullé 1846 (Mexico to northern South America), *C. melanostigma* Brullé 1846 (southern South America), *C. fuscofasciatus* Brullé 1846 (Peru), and several undescribed species from Mexico. The three species named above are new combinations in *Compsocryptus.* Their synonyms (all new) are as follows: *Cryptus opacorufus* Taschenberg 1876, *C. lateritus* Taschenberg 1876, and *Callicryptus pulchrifasciatus* Cameron 1909=*Compsocryptus melanostigma; Callicryptus magnificus* Viereck 1912=*Compsocryptus xanthostigma;* and *Callicryptus ornatipennis* Cameron 1902=*Compsocryptus fuscofasciatus.* Although they are brightly colored, several of the species are difficult to distinguish, especially in the male.

The species of *Compsocryptus* are often very common in open, dry or semidesert habitats, among short grass or herbage, or on almost bare ground. There are no host records.

Keys to the Nearctic species of Compsocryptus

MALES

1. Body entirely bluish black; wings blackish with a single transverse yellow band (fig. 357) . . . . **1. fasciipennis** (Brullé)
   Body entirely fulvous or fulvous and black; wings either uniformly dark or banded, if banded then with more than one yellow band 2
2. Mandible strongly narrowed apically, ending in a single tooth (the upper tooth) but the lower tooth often present as a weak subapical lobe; head a little wider across temples than across eyes . **8. buccatus** (Cresson)
   Mandible normal, moderately wide apically and ending in two teeth of approximately equal size; head narrower across temples than across eyes . 3
3. Flagellum entirely black 4
   Flagellum partly fulvous or light brown, at least on the under side basally . 5
4. Front wing uniformly dark brown; temple just below its midheight flat or weakly concave; third and fourth tergites not black at base.
   13. purpuripennis (Cresson)

Front wing light brown with indefinite darker brown bands; temple just below its midheight moderately convex; third and fourth tergites black at base . . . . **14. resolutus** (Cresson), in part

5. Front part of submetapleural carina very high, about 2.5 as high anteriorly as near its hind end; punctures on lateral lobe of mesoscutum rather sparse, separated usually by about 1.5 their diameter; clypeus a little wider than usual . . . . **14. resolutus** (Cresson), in part

Front part of submetapleural carina moderately high, about 1.5 as high anteriorly as near its hind end; punctures on lateral lobe of mesoscutum rather dense or sometimes rather sparse 6

6. Second tergite with its basal 0.25± black 7

Second tergite uniformly ferruginous or fulvous 8

7. Front wing strongly banded with brownish yellow and dark brown; propodeum with basal transverse carina present but sometimes indistinct.
6. crotchii (Cresson)

Front wing weakly banded with brownish yellow and pale brown; propodeum without basal transverse carina . . . . . . **9. tricinctus,** new species

8. Front wing brown, either uniformly brown or indistinctly banded 9

Front wing orange-yellow, strongly banded with dark brown. (Differentiating characters for males of the following species are not entirely reliable. Accurate determinations will depend on associations with females, consideration of geographic distribution, and the use of caution, as well as application of the key characters.) 11

9. Basal 0.2± of stigma fulvous brown, the rest blackish; third tergite not fuscous at base; basal transverse carina of propodeum indistinct; apical transverse carina of propodeum moderately strong, interrupted medially.
10. unicolor, new species

Basal 0.6± of stigma fulvous brown, the rest brown; third tergite usually with a pair of transverse fuscous marks at base; basal transverse carina of propodeum absent; apical transverse carina of propodeum absent or represented sublaterally by a weak vestige 10

10. Punctures on mesopleurum and metapleurum dense, separated by about 0.3 the diameter of the punctures; metapleurum usually black, sometimes fulvoferruginous margined with black . . . . **11. turbatus** (Cresson)

Punctures on mesopleurum and metapleurum moderately dense, separated by about 0.5 the diameter of the punctures; metapleurum usually fulvoferruginous margined with black, sometimes mostly black.
12. fletcheri (Provancher)

11. Front wing with a narrow premedian and a broad apical brown band (fig. 362), the apical brown band often containing a yellow spot; hind femur and third tergite entirely fulvous . . . . **5. apicalis,** new species

Front wing with a premedian, a subapical, and an apical brown band (figs. 358–361, and 364), the subapical and apical brown bands confluent posteriorly and only rarely the yellow area between them small, to give an appearance as in *C. apicalis;* hind femur often infuscate apically; third tergite often fuscous at base 12

12. Fourth tergite black at base; punctures on mesopleurum rather crowded; basal segment of flagellum entirely fulvous; hind femur entirely ferruginous or with a weak apical infuscation; range: east of Rocky Mountains.
2. texensis, new species

Fourth tergite not or rarely black at base; punctures on mesopleurum less crowded; basal segment of flagellum often fuscous above; hind femur often infuscate apically; range: Rocky Mountains to Pacific and much of Mexico, also western Texas 13

13. Hind femur usually infuscate apically; base of third tergite usually black or fuscous; bands on wings usually wider . . . . **3. calipterus** (Say)

Hind femur entirely ferruginous, or sometimes a little brownish near apex; base of third tergite not black or fuscous; bands on wings narrower . . 14

14. Front wing about 7.3 to 10.0 mm. long; basal transverse carina of propodeum complete or incomplete . . . . **4. aridus,** new species

Front wing about 11.5 mm. long; basal transverse carina of propodeum incomplete or indistinct . . . . **7. pallens,** new species

FEMALES

1. Hind femur very stout, about 2.7 to 3.2 as long as deep; second segment of flagellum about 2.0 as long as wide; thorax, coxae, trochanters, and femora with irregular scattered punctures and unusually long hairs.
14. resolutus (Cresson)

Hind femur more slender, at least 3.6 as long as deep; second segment of flagellum at least 2.5 as long as wide; thorax, coxae, trochanters, and femora more regularly punctate and with shorter hairs 2

2. Hairs on second tergite very dense, their sockets separated by less than the length of the hairs (except sometimes sparser on a small medioapical area). 3

Hairs on second tergite moderately sparse to very sparse, at least medioapically, where the hair sockets are separated by much more than the length of the hairs 6

3. Thorax and abdomen entirely bluish black; front wing black with one yellow band (fig. 357); metapleurum rather coarsely punctatorugose; occipital carina very strong . . . . **1. fasciipennis** (Brullé)

Thorax and abdomen mostly ferruginous or fulvous; front wing with two or three yellow areas; metapleurum rather finely punctatorugose; occipital carina moderately strong 4

4. Mandible strongly narrowed apically, ending in a single tooth (the upper tooth) but the lower tooth often present as a weak subapical lobe; head a little wider across temples than across eyes; ovipositor about 4.0 as long from nodus to apex as it is deep at nodus . . . . **8. buccatus** (Cresson)

Mandible normal, ending in two teeth of approximately equal size; head narrower across temples than across eyes; ovipositor more than 6.0 as long between nodus and apex as it is deep at nodus 5

5. First nine segments of flagellum uniformly ferruginous, without a trace of a white mark; punctures of mesopleurum a little finer and closer; basal transverse carina of propodeum sharp and complete . **2. texensis,** new species

First nine segments of flagellum ferruginous to fuscous, segments 6–9 usually more or less whitish above (always marked with whitish when basal flagellar segments are ferruginous, usually so marked when they are fuscous); basal transverse carina of propodeum usually incomplete.
3. calipterus (Say)

6. Ovipositor about 9.3 as long from nodus to apex as it is deep at nodus; ovipositor sheath about 1.35 as long as front wing; fourth tergite with a narrow fuscous band at base; front wing brown, with lighter brown areas.
9. tricinctus, new species

Ovipositor about 6.5 as long from nodus to apex as it is deep at nodus; ovipositor sheath 0.5 to 1.1 as long as front wing; fourth tergite not fuscous at base; front wing either rather uniformly dark brown, or yellowish banded with dark brown 7

7. Wings uniformly dark brown or blackish, except that costa and part of stigma may be paler and that some areas may be paler brown 8
   Wings yellowish, with broad brown bands 11

8. Temple just below its midheight almost flat, not rounded off to the occipital carina, the occipital carina in this area curved outward a little; second flagellar segment about 2.7 as long as wide; stigma black, its extreme base ferruginous or brown; basal 0.3 ± of subcosta ferruginous, the rest blackish. **13. purpuripennis** (Cresson)
   Temple just below its midheight moderately convex, curved mesad to occipital carina; second flagellar segment about 3.5 as long as wide; stigma blackish, its basal 0.4 ± fulvous; basal 0.7 ± of subcosta ferruginous or fulvous, the rest blackish 9

9. Third tergite without a basal fuscous band; wider subapical segments of flagellum about 0.62 as long as wide; temple less convex. **10. unicolor,** new species
   Third tergite with a basal fuscous band (often interrupted medially); wider subapical segments of flagellum about 0.65 to 0.85 as long as wide; temple more convex, especially below 10

10. Punctures on mesopleurum and metapleurum dense or crowded, most of their interspaces about 0.3 the diameter of the punctures; widest subapical segments of flagellum about 0.7 as long as wide . **11. turbatus** (Cresson)
   Punctures on mesopleurum and metapleurum moderately dense, most of their interspaces about 0.6 the diameter of the punctures; widest subapical segments of flagellum about 0.8 as long as wide. **12. fletcheri** (Provancher)

11. Basal transverse carina of propodeum complete, traceable as a definite carina throughout its length . . . . **4. aridus,** new species
   Basal transverse carina of propodeum represented by a short spur behind spiracle, elsewhere absent or very indistinct and incomplete 12

12. Front wing with a broad apical and narrow premedial brown band, the apical brown area sometimes containing a yellow spot (fig. 362). **5. apicalis,** new species
   Front wing with apical, subapical, and premedian brown bands, the apical and subapical bands confluent posteriorly (figs. 363 and 364) 13

13. Brown bands on front wing wider (fig. 363); wrinkling on mesopleurum rather fine; flagellum without a median yellowish band . . **6. crotchii** (Cresson)
   Brown bands on front wing narrower (fig. 364); wrinkling on mesopleurum rather coarse; flagellum with an indistinct median yellowish band. **7. pallens,** new species

1. Compsocryptus fasciipennis (Brullé)

FIGURE 357

Cryptus fasciipennis Brullé, 1846, *in* Lepeletier, Histoire naturelle des insectes, hyménoptères, vol. 4, p. 191; ♂, ♀. Lectotype (hereby designated): ♀ (labeled lectotype by Townes), no data on specimen but stated by Brullé to come from Cuba (Paris).

Male: Front wing 7.2 to 11.0 mm. long; temple at midheight about 0.73 as long as eye, flat; occipital carina very high; mesopleurum with coarse punctures which on its central part are somewhat confluent; propodeal carinae as in female.

Colored like the female, except that fulvous tinges on head are indistinct.

Female: Front wing 8.0 to 11.7 mm. long; temple at midheight about 0.65 as long as eye, weakly convex; occipital carina very high; second segment of flagellum about 3.3 as long as wide; widest subapical segments of flagellum about 0.65 as long as wide; mesopleurum medially with moderately coarse, irregular rugulosity resulting from confluence of coarse punctures, marginally with very close or somewhat confluent medium-sized punctures; basal carina of propodeum strong and complete; apical carina complete or weak or absent medially and laterally, sublaterally developed as a broad weak tooth; hind femur about 5.5 as long as deep; second tergite covered with small, very dense punctures and dense short hairs; ovipositor sheath about 0.67 as long as front wing; ovipositor about 6.3 as long from nodus to apex as it is deep at nodus.

Head, body, and wings blackish blue. Head with some fulvous tinges; antenna yellow, its apical third fuscous; wings each with a broad transverse orange-yellow band, as in figure 357.

Specimens (75♂, 44♀): From Florida (Biscayne Bay, Florida City in Dade Co., Homestead, Key Largo, Key Vaca, Key West, Larkins in Dade Co., Marathon, Matecumbe Key, Matheson Hammock in Miami, Miami, Paradise Key in Everglades National Park, "Racoon Key," Royal Palm State Park, and Sugarloaf Key); and Cuba (Baños, Paso Real, and Soledad in Cienfuegos).

Dates of collection are from December to April, most of them from December 28 to April 12. The only records outside of this restricted period are December 5 at Marathon, Fla.; and April 19, 20, and 25 at Paso Real, Cuba.

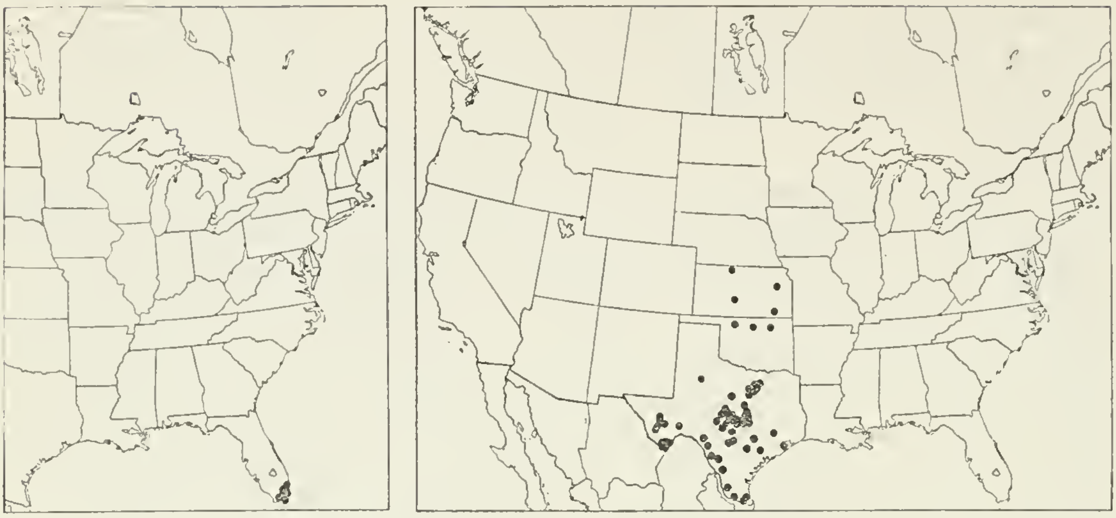
This species occurs in Cuba and the tropical part of Florida.

2. Compsocryptus texensis, new species

FIGURE 358

Male: Front wing 7.0 to 12.5 mm. long; temple at midheight about 0.97 as long as eye, weakly convex, a little less strongly convex than in *C. calipterus*; punctures on mesopleurum rather close, separated on the average by about 0.33 their diameter; basal transverse carina of propodeum complete and sharp; apical carina of propodeum absent or represented by sublateral vestiges.

Colored like the male of *C. calipterus calipterus* except that basal 0.65 of flagellum is fulvous with sometimes a weak infuscation on upper side of basal segment, hind femur is fulvous with sometimes



Figures 150, 151.—Localities: 150 (left), *Compsocryptus fasciipennis;* 151 (right), *C. texensis.*

a weak apical infuscation, and third tergite has a basal infuscate area. Usually the base of fourth tergite is narrowly infuscate.

Female: Front wing 7.5 to 12.5 mm. long; temple at midheight about 0.80 as long as eye, weakly convex, a little less strongly convex than in *C. calipterus;* punctures on mesopleurum small, sharp, very dense, their interspaces almost obliterated; second tergite with small dense punctures and short dense hairs all over except on apical margin. Structure otherwise as described for female of *C. calipterus calipterus.*

Colored like female of *C. calipterus calipterus* except that ground color is a little darker ferruginous, first nine segments of flagellum uniformly ferruginous, and dark bands on wings a little wider. Front wing banded as in figure 358.

Type: ♀, Bexar Co., Tex., Mar. 27, 1931, H. B. Parks (Washington, USNM 63792).

Paratypes (107♂, 138♀): From Kansas (Montgomery Co. at 798 ft., Phillipsburg, Salt Flats Area in Stafford Co., and Topeka); Oklahoma (Alva, Stillwater, and Tulsa); Texas (Alpine, Austin, Austin State Park near Sealy, The Basin in Big Bend National Park at 5,000 to 6,000 ft., Blanco Co., Brownsville and south of Texas Garden in Brownsville, Caldwell Co., Cameron, Carrizo Springs, Cherryspring, Chisos Mts., Comstock, Crystal City, Dallas, Davis Mts., Del Rio, Eagle Mountain Lake near Fort Worth, Eagle Pass, Eastland Co., Fedor, 6 to 10 miles west of Fort Davis on Texas Route 166 at 5,000 ft., Fort Sam Houston in Bexar Co., Fredericksburg, Giddings, Grapevine Springs in Big Bend National Park at 3,000 ft., Green Gulch in Big Bend National Park at 5,000 ft., Greenville, Harper, Headquarters of Big Bend National Park at 3,500 to 4,000 ft., Hunt Co., Karnes City, Kerrville and 10 miles north of Kerrville, La Grange, Lando Park in Comal Co., Liberty Hill, Lopeño, Medina Lake in Medina Co., "Neuecest," Palmetto State Park in Gonzales Co., Palo Pinto, 10 miles south of Pharr, Plano, Port Arthur, Salado Creek in Bexar Co., San Antonio and Loop 13 in San Antonio, Sanderson, Snyder, Tornillo Flats in Big Bend National Park at 2,500 ft., Uvalde, Victoria, Waco, Webb Co., and White Rose Canyon in Jeff Davis Co.); and Mexico (50 miles south of Monterrey in Nuevo Leon at 1,700 ft., 5 miles east of Padilla Rancho Santa Ana in Tamaulipas, and 6 miles north of C. Victoria in Tamaulipas).

Collection dates are mostly in spring, some in fall, and a very few during the summer months. The peak season of abundance for the spring period is from March 15 to May 15, with fewer in the first half of March and last half of May. The records outside of the March through May span are: January 1 at Brownsville, Tex.; February 4 at Crystal City, Tex.; February 18 at Uvalde, Tex.; June 18 at White Rose Creek, Davis Co., Tex.; June 29 in Gillespie Co., Tex.; July 6 in the Davis Mts., Tex.; July 15 at 6 to 10 miles west of Fort Davis, Tex.; and August 7 at Alva, Okla. The fall flight period extends from about October 4–31. The only captures outside of this range are September 24 in Eastland Co., Tex.; November 24 and 26 at Brownsville, Tex.; and November 17 and December 22 in Tamaulipas, Mexico.

This species is abundant and widespread in Texas and ranges northward into Kansas and southward into nearby parts of Mexico.

3. Compsocryptus calipterus Say

Male: Front wing 7.5 to 12.5 mm. long; temple at midheight about 1.0 as long as eye, moderately convex; punctures on mesoscutum moderately coarse, strong, separated by about 0.5 their diameter; basal transverse carina of propodeum varying from complete and sharp to incomplete and indistinct, sometimes entirely absent; apical transverse carina usually indicated by two very weak, oblique sublateral ridges.

Ferruginous. Usually the middle of frons and vertex, occiput, apical 0.4 of flagellum, sutural markings of thorax (usually of moderate width but sometimes narrow and sometimes expanded to cover much of thorax), and sometimes markings on coxae, black; hind femur usually fuscous apically, sometimes mostly blackish with its base ferruginous; hind tibia fuscous, pale basally; basal 0.2± of third tergite usually black or fuscous; rarely the base of fourth tergite fuscous; upper side of pedicel blackish; basal 0.6± of flagellum often infuscate above, especially on its first segment; wings yellowish with three transverse dark brown bands, their width variable, according to the subspecies; hind tarsus fulvous.

Female: Front wing 8.0 to 12.5 mm. long; temple at its midheight about 0.83 as long as eye, moderately convex; second flagellar segment about 3.3 as long as wide, but the length a little variable according to the subspecies; widest subapical segments of flagellum about 0.67 as long as wide; punctures on mesopleurum of moderate size, sharp, crowded, their interspaces very narrow; basal transverse carina of propodeum varying from complete and moderately strong to absent except for a short vestige behind the spiracle; apical carina of propodeum moderately strong, widely interrupted in the middle; hind femur about 5.4 as long as deep; hairs on second tergite dense except on the median apical part, where their sockets are separated by a little more than the length of the hairs; ovipositor sheath about 0.90 as long as front wing; ovipositor about 6.2 as long from nodus to apex as it is deep at nodus.

Ferruginous. Median part of occiput and sutural marks on thorax black; basal part of flagellum fulvous or more or less infuscate; apical part of flagellum blackish; flagellum usually with a broad median incomplete whitish band; wings orange yellow marked with dark brown, the pattern on the front wing as in figures 359 and 360; hind femur usually brownish apically; hind tibia infuscate apically; basal 0.2± of second tergite black, the black mark not reaching lateral edge of tergite and often narrowed or interrupted medially.

There are two subspecies, distinguished mostly by the extent of infuscation on the wings and flagellum. They intergrade gradually and freely in southern California and adjacent Mexico. Specimens from this area of intergradation have been classified and recorded as one subspecies or the other, rather arbitrarily according to their greater conformity with the majority of characters of one or the other, as keyed and described below.

MALES

1. Yellow markings on wings more extensive, the apical yellow area on front wing usually reaching subdiscoidal vein (fig. 359); segments 2–5 of flagellum fulvous or brownish fulvous, not at all infuscate above; range: western Texas and Oklahoma to southern California, southward into Mexico. **3a. calipterus calipterus** (Say)

   Yellow markings on wings less extensive, the apical yellow area on front wing usually not reaching subdiscoidal vein (fig. 360); segments 2–5 of flagellum usually fuscous or somewhat infuscate above; range: California, except part of southern California . . **3b. calipterus brevicornis** Cameron

FEMALES

1. Yellow markings on wings more extensive, the apical yellow area on front wing reaching subdiscoidal vein (fig. 359); flagellum with a median dorsal

white stripe that covers 3.7 to 4.7 segments; range: western Texas to southern California, southward into Mexico.
3a. calipterus calipterus (Say)

Yellow markings on wings less extensive, the apical yellow area on front wing usually not reaching subdiscoidal vein (fig. 360); flagellum with median dorsal white stripe reduced, obscure, or sometimes absent, covering usually about 3 segments; range: California except part of southern California . . . . **3b. calipterus brevicornis** Cameron

3a. Compsocryptus calipterus calipterus (Say)

FIGURE 359

Cryptus calipterus Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 234 (Leconte ed., vol. 2, p. 690); ♀. Type: ♀, Mexico (destroyed).

Cryptus fulvus Taschenberg, 1876, Zeitschr. Ges. Naturwiss., vol. 48, p. 66; ♂. New synonymy. Type: ♂, Mexico (Halle).

Ichneumon munerosus Cameron, 1885, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 159; ♂. New synonymy. Type: ♂, northern Sonora, Mexico (London).

Cryptus (*Mansa*?) *politicalypterus* Viereck, 1905, Trans. Kansas Acad. Sci., vol. 19, p. 293; ♂. Type: ♂, Bill Williams Fork, Ariz. (Lawrence).

Average size a little smaller than in the subspecies *brevicornis* and flagellar segments averaging slightly longer, the second segment of female flagellum about 3.3 as long as wide.

Ground color fulvoferruginous. Male flagellum with its basal two-thirds fulvous or brownish fulvous, the first segment often infuscate above; midlength of male flagellum with an indistinct pale fulvous or yellowish band; female flagellum fuscous or dark brown, its first three segments fulvous to fuscofulvous, its median part with a white stripe above that covers 3.7 to 4.7 segments; fuscous areas on head and thorax of male averaging less extensive than in subspecies *brevicornis*; yellow areas on wings more extensive than in subspecies *brevicornis*, the apical yellow area on front wing reaching subdiscoidal vein and basal transverse fuscous band on front wing relatively narrow.

Specimens (90♂, 58♀): From Arizona (Apache and 8 miles northeast of Apache in Cochise Co. at 5,000 ft., Arlington, Avra Valley, Bowie, Douglas, Duncan, 10 miles southwest of Eloy, Hereford, Huachuca Mts., Maricopa Mts., Oak Creek Canyon, Patagonia on Soncita Creek, Phoenix, Portal at 5,000 ft., and 5 miles west of Portal at 5,400 ft., Roosevelt Dam, near Roosevelt Lake, San Bernardino Ranch in Cochise Co. at 3,750 ft., San Carlos, Sunnyside Canyon in Huachuca Mts., Tempe, Theba, 10 miles south of Toltec in Pinal Co., Tucson, and Yuma); California (Blythe, Cajon Pass in San Bernardino Co., Calexico, 12 miles east of Heber, Indio, and Piñon Flat in San Jacinto Mts.); New Mexico (Las Cruces, Rodeo, Skelton Canyon near Rodeo, and Torrance Co.); Oklahoma (Kenton); Texas (The Basin in Big Bend National Park at 5,000 to 6,000 ft., Davis Mts., Fort Davis, 18 miles west of Fort Davis, 6 to 10 miles and 25 miles west of Fort Davis on Texas Route 166 at 5,000 ft., Green Gulch in Big Bend National Park at 5,000 ft., Headquarters of Big Bend National Park at 3,500 ft., Sanderson, Station Elena in Big Bend National Park at 2,100 ft., and Tornillo Flats in Big Bend National Park at 2,500 ft.); and Mexico (Aguascalientes at 6,225 ft., Buena Vista in Sierra del Carmen in Coahuila at 6,000 ft., 8 miles south of Canutilo in Durango, 15 km. north of Chapalilla in Nayarit, 34 miles south of Chihuahua at 3,650 ft., 5 miles E. C. del Maiz, Durango at 6,300 ft., Encino in Durango at 6,200 ft., Guadalupe in Distrito Federal, 33 miles south of Hidalgo del Parral at 6,400 ft., 60 miles south of Hidalgo del Parral at 6,250 ft., Los Mochis in Sinaloa, Morelia, North Central Mexico, Oaxaca, 3 miles north of Oaxaca, Pachuca in Hidalgo at 7,300 ft., Puerta de la Goriona in Sierra del Carmen in Coahuila at 4,900 ft., 5 miles north of Salamanca at 6,000 ft., 17 miles north of Saltillo at 4,850 ft., 14 miles north of Saltillo at 4,550 ft., San Juan del Rio and 10 miles east of San Juan del Rio in Querétaro at 6,500 ft., 10 miles northeast of San Luis Potosí at 6,200 ft., 15 km. east of Sombrerete in Zacatecas, Sonoyta in Sonora at 1,500 ft., Teotihuacan Pyramids, Valle del Yaqui in Sonora, Villa Guadalupe in Jalisco, and 10 km. west of Zitacuaro in Michoacan).

Collecting dates are distributed mostly from April 20 to October 30. Those outside of this range are: March 6 at Indio, Calif.; April 4 at Sonoyta, Sonora, Mexico; November 2 at Theba, Ariz.; and December 6 at Blythe, Calif.

This subspecies ranges from western Texas and Oklahoma to southern California, and southward into Mexico. Over much of its range it is the commonest form in the genus.

3b. Compsocryptus calipterus brevicornis Cameron, new status

FIGURE 360

Campsocryptus (!) *brevicornis* Cameron, 1903, Invert. Pacifica, vol. 1, p. 127; ♀. Type: ♀, Claremont, Calif. (London).

Average size a little larger than in the subspecies *calipterus* and flagellar segments averaging a little shorter, the second segment of female flagellum about 3.0 as long as wide.

Ground color ferruginous. Basal two-thirds of male flagellum fulvous but usually more or less fuscous above, the first segment always with some fuscous above; male flagellum usually with an indistinct paler fulvous or yellowish band at about midlength; female flagellum fuscous or dark brown, the basal three segments more or less fuscofulvous and near the middle usually with a white or whitish stripe above that covers about 3 segments; head and thorax of male usually more extensively fuscous than in subspecies *calipterus*, often more than half fuscous; yellow areas on wings less extensive than in subspecies *calipterus*, the apical yellow area of front wing seldom reaching subdiscoidal vein and basal transverse fuscous band of front wing broader than in *calipterus*.

Specimens (127♂, 112♀): From California (Antioch, Artois, Bolinas, Brentwood, Claremont, Coronado, Costa Mesa, Cucamonga, Davis, Dos Palos, Firebaugh, Fort Tejon in Kern Co., Glendale, Hemet, Irvington, Lake Curry in Solano Co.?, Los Angeles, Marion Mountain Camp in San Jacinto Mountains, Millbrae, Mount Diablo, Newport Bay in Orange Co., Oakland, Oxalis in Fresno Co., Oxnard, Palo Alto, Pasadena, Patterson, Pismo, Pleasanton, Poway, Putah Creek, Redding, Ryer Island in Solano Co., Sacramento, San Andreas, San Bernardino Co., San Clemente, San Diego, San Francisco, San Jose, Santa Barbara Foothills, Santa Catalina Island in Los Angeles Co., Santa Cruz, Santa Paula, Saticoy, Sobrante, Stanford University, Tanbark Flat in Los Angeles Co., Tolay Creek in Sonoma Co., Tracy, Vacaville, Ventura, Vernalis, Vina, Westley, Westwood Hills in Los Angeles Co., and Woodland).

Dates of collection are distributed from April through October, with a concentration of them in June, July, and August. Dates outside of the April–October range are: January 19 at Westwood Hills, Los Angeles Co., Calif.; March 4 at Claremont, Calif.; "November" at Los Angeles, Calif.; November 2 at Pleasanton, Calif.; and December 20 at Davis, Calif.

This subspecies occurs in California, ranging from the coast into the foothills of the Sierra Nevada. In southern California it intergrades with and in some areas is replaced by the subspecies *calipterus*.

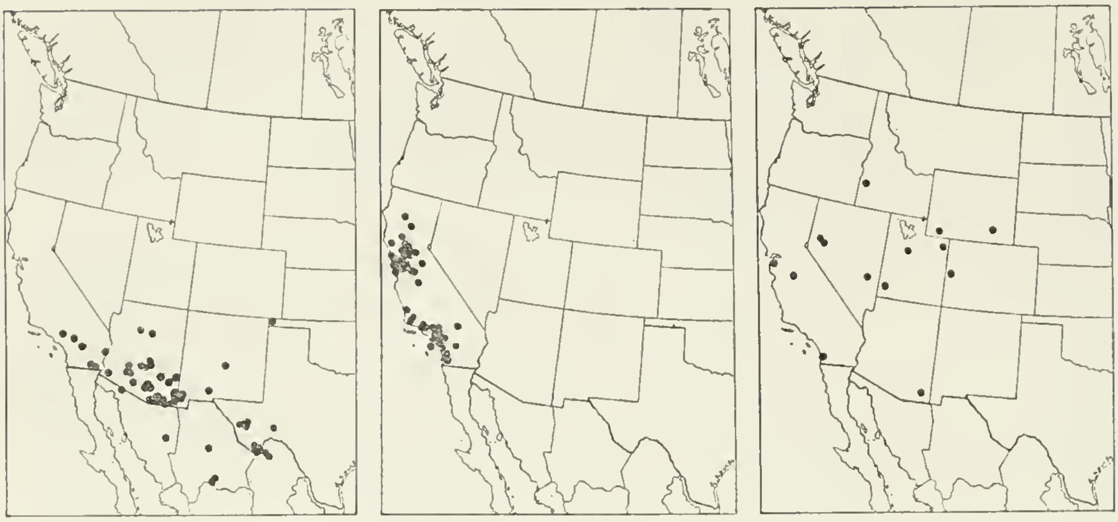
4. Compsocryptus aridus, new species

FIGURE 361

Male: Front wing 7.3 to 10.2 mm. long; temple at midheight about 0.86 as long as eye, weakly convex; punctures on mesopleurum moderately coarse and strong, separated on the average by 0.4 their diameter; basal transverse carina of propodeum complete or incomplete; apical carina complete, incomplete, or absent.

Fulvoferruginous. Area on lower part of frons, occiput, and restricted sutural markings on thorax, black; apical 0.35 of flagellum dark brown; hind tibia infuscate apically; hind tarsus fulvous; wings colored as in female; base of third tergite with a pair of transverse fuscous spots.

Female: Front wing 7.5 to 9.4 mm. long; temple at midheight about 0.82 as long as eye, moderately convex; second flagellar segment



FIGURES 152–154.—Localities: 152 (left), *Compsocryptus calipterus calipterus;* 153 (center), *C. c. brevicornis;* 154 (right), *C. aridus.*

about 3.8 as long as wide; widest subapical segments of flagellum about 0.70 as long as wide; punctures on mesopleurum of moderate size, separated by about 0.7 their diameter but partly confluent with longitudinal wrinkling; basal transverse carina of propodeum complete, sharp throughout its length; apical transverse carina of propodeum rather strong, interrupted medially; hind femur about 4.8 as long as deep; hairs on second tergite sparse, their sockets separated by about 1.8 the length of the hairs, on basal and lateral parts of the tergite somewhat denser; ovipositor sheath about 0.70 as long as front wing; ovipositor about 6.1 as long from nodus to apex as it is deep at nodus.

Fulvoferruginous. Very narrow area along some of thoracic sutures and a pair of broadly transverse spots on basal 0.2 of third tergite black; flagellum with a broad, indistinct median yellowish band, its apical 0.45± fuscous; wings brownish yellow marked with dark brown, the pattern of the front wing as in figure 361.

Type: ♀, Boise, Idaho, 2,692 ft., May 13, 1934, R. E. Miller (Washington, USNM 63793).

Paratypes (10♂, 13♀): From Arizona (Willcox); California (Dos Palos, Millbrae, and San Diego); Colorado (Grand Junction at 4,500 ft.); Idaho (Boise at 2,692 ft.); Nevada (15 miles southwest of Current in Nye Co., Fallon at 4,000 ft., and 10 miles east of Fernley); New Mexico; Utah (Eureka, Des[ert] Range Experiment Station at Milford, and Uintah Co.); and Wyoming (Green River at 6,100 ft. and Medicine Bow at 6,600 ft.).

Most dates of collection are from May 24 to August 3. Those outside of this range are: April 19 at Willcox, Ariz.; May 2 at San Diego, Calif.; May 13 at Boise, Idaho; August 7 at Dos Palos, Calif.; and September 1 at Millbrae, Calif.

This species is widespread in the Sonoran faunas of southwestern United States.

5. Compsocryptus apicalis, new species

FIGURE 362

Male: Front wing 9.5 to 11.5 mm. long; temple at midheight about 0.76 as long as eye, very weakly convex; punctures on mesopleurum rather coarse, strong, separated usually by about 0.3 their diameter but often more crowded or often sparser; basal transverse carina of propodeum indistinct except behind spiracle; apical transverse carina blunt, irregular, usually interrupted medially and often indistinct.

Fulvoferruginous. Most of occiput black; upper side of pedicel and of first flagellar segment usually infuscate; apical 0.4 of flagellum fuscous; narrow sutural markings on thorax black; hind tibia infuscate apically; tarsi yellowish fulvous; wings colored as in female; base of third tergite sometimes narrowly infuscate.

Female: Front wing 9.5 to 10.5 mm. long; temple at midheight about 0.76 as long as eye, weakly convex; second flagellar segment about 3.7 as long as wide; widest preapical segments of flagellum about 0.64 as long as wide; punctures on mesopleurum moderately small, strong, crowded and somewhat confluent with irregularly longitudinal wrinkles; basal transverse carina of propodeum absent or sometimes incomplete and indistinct; apical transverse carina very strong, interrupted medially; sculpture of propodeum near apical transverse carina exceptionally coarse; hind femur about 5.5 as long as deep; hairs on most of second tergite sparse, their sockets separated by about 2.0 the length of the hairs, denser near base and sides of the tergite; ovipositor sheath about 0.60 as long as front wing; ovipositor from nodus to apex about 5.9 as long as it is deep at nodus.

Fulvoferruginous. Flagellum with a broad yellowish white median band which is incomplete below, black beyond the band; thorax without or almost without black sutural markings; wings orange yellow with dark brown markings, the front wing marked as in figure 362 (the small subapical yellow spot on front wing is of variable size and sometimes absent); apex of hind tibia weakly infuscate; basal 0.18± of third tergite with a black mark that does not reach its lateral edge and is narrow or divided medially.

Type: ♀, Poncha Pass, Colo., Aug 1, 1914 (Washington, USNM 63794).

Paratypes (22♂, 14♀): From British Columbia ("Dog Lake"); California (Antioch, Boca, Lake Britton in Shasta Co., 1 mile north of Lake City, Lava Beds National Monument in Siskiyou Co., Markleeville in Alpine Co., 2 miles south of Perez in Modoc Co., "Red Rock" in Siskiyou Co., Silver Creek in Alpine Co., and Tolay Creek in Sonoma

Co.); Colorado (Poncha Pass and Poudre Camp in Larimer Co. at 5,200 ft.); Idaho (Pollock); Nevada (Verdi); New Mexico (Las Cruces); Oregon (Blitzen Valley and Summer Lake in Lake Co.); and Utah (Newton, South Creek in Beaver Co., and Watson in Uintah Co. at 5,300 and 5,360 ft.).

Dates of collection are mostly in July and August. Those outside of this range are: June 16 at Verdi, Nev.; June 28 at Boca, Calif.; June 29 at Lake Britton, Shasta Co., Calif.; and October 13 at Antioch, Calif.

This species is widespread west of the Rocky Mountains.

6. Compsocryptus crotchii (Cresson)

FIGURE 363

Cryptus Crotchii Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 362; ♂, ♀. Lectotype: ♀, San Diego, Calif. (Philadelphia).

Male: Front wing 12 to 13 mm. long; temple at midheight about 1.07 as long as eye, moderately convex; punctures on mesopleurum of moderate size, strong, separated by about 0.7 their diameter; basal transverse carina of propodeum complete but indistinct sublaterally; apical transverse carina absent.

Ferruginous, the head and mouth parts fulvous or fulvoferruginous. Frontal orbit yellowish; median part of vertex and frons, sometimes median part of face, markings along clypeal suture, occiput, most of thorax, markings on coxae, hind femur except near base, hind tibia except near base, basal 0.65± of first abdominal segment, basal 0.4± of second and third tergites, and basal band on median part of fourth and fifth tergites, black; apical 0.45 of flagellum fuscous; basal 0.55 of flagellum weakly infuscate above; wings marked as in female; front and middle legs beyond femora and hind tarsus yellowish. The ferruginous areas of thorax include broad upper margin and narrow marginal areas on collar and near front lower corner of pronotum, most of mesoscutum and scutellum, most of median part of propodeum (but nearly subdivided by a median black stripe), subtegular ridge, and area on upper half of mesopleurum.

Female: Front wing 10.8 to 13.0 mm. long; temple at midheight about 1.0 as long as eye, moderately convex; second flagellar segment about 3.5 as long as wide; widest subapical segments of flagellum about 0.65 as long as wide; punctures on mesopleurum small, strong, rather crowded and on median part of mesopleurum a little confluent with irregularly longitudinal wrinkling; basal transverse carina of propodeum represented by a short vestige behind spiracle; apical transverse carina distinct and rather strong, but its median 0.2± absent; hind femur about 4.9 as long as deep; hairs on median and medioapical part of second tergite sparse, their sockets separated by about 2.0

the length of the hairs, elsewhere denser, in the densest places their sockets separated by about 0.5 the length of the hairs; ovipositor sheath about 0.80 as long as front wing; ovipositor from nodus to apex about 6.5 as long as it is deep at nodus.

Ferruginous. Central part of occiput, apical half of flagellum, sutural markings on thorax, basolateral area on second tergite, and basal 0.3± of third tergite, black; hind femur faintly infuscate apically; hind tibia strongly infuscate apically; hind tarsus yellowish fulvous; wings banded with brownish yellow and dark brown, the pattern on front wing as shown in figure 363.

Specimens: ♀, Fort Seward, Calif., June 17, 1935, H. J. Rayner (Davis). ♀, Mount Hamilton, Calif., June 19, 1940 (Townes). 2♂, 2♀, 4 miles west of Quincy, Plumas Co., Calif., June 22, 1949, P. D. Hurd and R. L. Sisson (Berkeley and Townes). 2♀, 4 miles west of Quincy, Plumas Co., Calif., June 19 and 20, 1949, P. D. Hurd (Berkeley and Townes). ♀, Tejon Canyon, Kern Co., Calif., May 12, 1927, E. C. Van Dyke (Townes).

This species is known only from California.

7. Compsocryptus pallens, new species

FIGURE 364

Male: Front wing 11.7 to 12.0 mm. long; temple at midheight about 1.0 as long as eye, moderately convex; punctures on mesopleurum of moderate size, strong, separated by about 0.7 their diameter; basal transverse carina of propodeum incomplete, mostly indistinct; apical transverse carina of moderate strength, irregularly sinuate, interrupted medially.

Fulvous or fulvoferruginous. Lower median part of frons, occiput, apical 0.45 of flagellum, and sutural marks on thorax, black; apex of hind femur brownish; hind tibia blackish, pale at base; tarsi yellowish fulvous; wings colored as in female; basal 0.3 of third tergite black, the black mark not reaching side of tergite, narrowed medially.

Female: Front wing 10.5 to 13.0 mm. long; temple at midheight about 0.87 as long as eye, rather weakly convex; second flagellar segment about 3.4 as long as wide; widest preapical segments of flagellum about 0.60 as long as wide; punctures on mesopleurum moderately small, crowded, partly confluent with irregular wrinkling that usually has a longitudinal tendency; basal transverse carina on propodeum incomplete and indistinct, or absent; apical transverse carina strong, interrupted medially; hind femur about 4.9 as long as deep; hairs on second tergite rather sparse, on most of the tergite their sockets separated by about 1.5 the length of the hairs but somewhat denser basally and laterally; ovipositor sheath about 0.73 as long as front wing; ovipositor about 6.3 as long from nodus to apex as it is deep at nodus.

Fulvous or fulvoferruginous. Middle of occiput, apical 0.45 of flagellum, restricted sutural markings on thorax, and basal 0.2± of third tergite black, the black on third tergite not reaching side of tergite and narrowed medially; flagellum with a very indistinct median yellowish band; wings orange yellow, marked with dark brown, the front wing as in figure 364; apex of hind femur usually a little brownish; hind tibia usually a little infuscate at apex; hind tarsus pale fulvous; base of second tergite sometimes with a fuscous blotch on each side.

Type: ♀, Pollock, Idaho, July 12, 1907, J. M. Aldrich (Washington, USNM 63795).

Paratypes: ♀, Lone Pine, Calif., June 1, 1941, R. M. Bohart (Davis). ♀, Surprise Canyon, Panamint Mts., Inyo Co., Calif., Apr. 24, 1957, J. Powell (Berkeley). ♀, "Red Mountain," Calif., May 11, 1955, W. R. M. Mason (Ottawa). 2♂, 3 miles east of Walker Pass, Kern Co., Calif., Apr. 25, 1952, G. A. Marsh and J. G. Rozen (Berkeley). ♀, Colo., C. F. Baker (Washington). ♀, Fish Lake, Steens Mts., Oreg., July 26, 1936, S. G. Jewett, Jr. (Corvallis). ♀, 10 miles east of Beaver in Beaver Canyon, Utah, June 11, 1946, R. M. Bohart (Townes).

This species in known from Oregon, California, and Utah.

8. Compsocryptus buccatus (Cresson)

FIGURE 365

Cryptus buccatus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 159; ♂, ♀. Lectotype: ♀, Texas (Philadelphia).

Male: Front wing 9.0 to 12.0 mm. long; temple at midheight about 1.18 as long as eye, rather strongly convex, bulged so that head is a little wider across temples than across eyes (in all other species of the genus the head narrower across temples than across eyes); mandible long, tapered to a narrow apex and a single point (the upper tooth), its lower tooth present as a weak subapical lobe (in all other species of the genus mandible is of normal width and ends in two teeth of approximately equal size); punctures on mesopleurum of medium size, strong, separated by about 0.3 their diameter; transverse carinae of propodeum very indistinct or entirely absent; punctures on first tergite unusually dense.

Fulvoferruginous. Usually face, cheek, frontal orbit, usually clypeus, broad median band on flagellum, front and middle legs beyond trochanters, and hind tarsi, fulvous to yellowish; head, thorax, and coxae with a variable amount of black, sometimes most of head (including all of face and clypeus), all of prothorax, mesopleurum and metapleurum, thoracic sterna, and coxae entirely black, sometimes black markings restricted to occiput, thoracic sutures and apices of coxae; basal 0.45 of flagellum fulvous brown and fuscous (in various proportions), beyond which is a yellowish or fulvous band, the apical 0.35 of flagellum black; hind femur and tibia entirely fulvoferruginous or more or less blackish; wings orange yellow banded with dark brown, as in female; second and third tergites, sometimes also fourth and fifth, and rarely also the sixth tergite fuscous at base.

Female: Front wing 10.5 to 13.0 mm. long; temple and mandible as described for the male; second segment of flagellum about 2.9 as long as wide; punctures on mesopleurum small, sharp, and dense, just below middle of mesopleurum crowded to form rugulosity; basal transverse carina of propodeum indistinct, entirely absent sublaterally; apical carina of propodeum indistinct sublaterally, elsewhere absent; hind femur about 5.0 as long as deep; setiferous punctures on second tergite all very dense, separated by about 0.6 the length of the hairs, which are quite short; ovipositor sheath about 0.55 as long as front wing; ovipositor about 4.2 as long from nodus to apex as it is deep at nodus.

Fulvoferruginous. Flagellum medially with a subcomplete whitish band, basad of which it is fulvous, the apical part missing from specimens at hand; some thoracic sutural markings black; front wing orange, banded with dark brown as in figure 365; basal 0.28± of third tergite black.

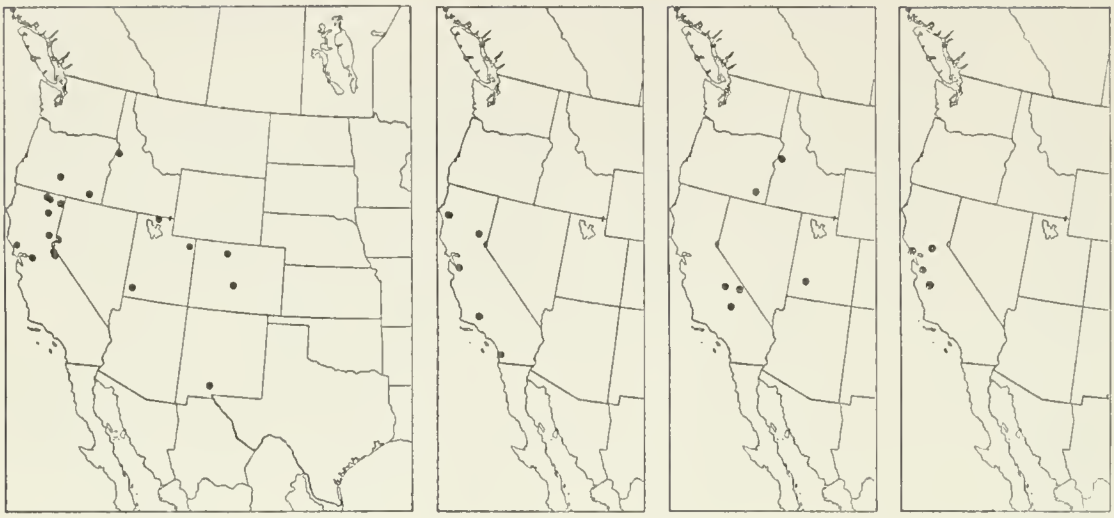
Specimens: ♂, ♀ (paratypes), Texas, Belfrage collection (Washington). ♂, Saltillo, Coahuila, Mex., Oct. 16, 1957, H. A. Scullen (Corvallis). 2♂, 1♀, Teotihuacan, Mex., Oct. 29, 1957, R. and K. Dreisbach (Dreisbach).

9. Compsocryptus tricinctus, new species

FIGURE 366

Male: Front wing 11.5 to 12.5 mm. long; temple at midheight about 1.15 as long as eye, weakly convex; punctures on mesopleurum rather small, strong, separated by about 0.6 their diameter; both basal and apical transverse carinae of propodeum completely lacking.

Ferruginous. Median part of frons and vertex, occiput, a pair of vertical stripes from antennal sockets to upper condyles of mandible, apical and sometimes basal margin of clypeus, under side of thorax, much to almost all of side of thorax, thoracic sutures, and basal 0.2 to 0.4 of tergites 1–6, black; scape black except below; pedicel black; apical 0.4± of flagellum fuscous, the rest of flagellum fulvous brown but darker above, the basal segment fuscous above; coxae marked with black, mostly at base and apex; hind trochanters sometimes marked with fuscous; apical 0.3± of hind femur infuscate; hind tibia



Figures 155–158.—Localities: 155 (left), *Compsocryptus apicalis;* 156 (center, left), *C. crotchii;* 157 (center, right), *C. pallens;* 158 (right), *C. tricinctus.*

fuscous, paler basally; tarsi yellowish; wings yellowish brown, with indistinct brown bands, in the same pattern as female (fig. 366) but paler.

Female: Front wing 11.0 to 12.0 mm. long; temple at midheight about 1.0 as long as eye, moderately convex; second flagellar segment about 3.4 as long as wide; widest subapical segments of flagellum about 0.65 as long as wide; punctures on mesopleurum rather small, separated by about 0.35 their diameter, in places somewhat confluent with fine, rather weak longitudinal wrinkling; basal transverse carina of propodeum represented by a short weak vestige behind spiracle; apical transverse carina represented by a rather long, weak sublateral carina, absent medially and laterally; setiferous punctures on median and medioapical part of second tergite separated by about 1.7 the length of the hairs, elsewhere denser, separated in the densest areas by about 0.8 the length of the hairs; ovipositor sheath about 1.35 as long as front wing; ovipositor about 9.3 as long from nodus to apex as it is deep at nodus.

Ferruginous. Median part of occiput, clypeal foveae, sometimes part of ocellar area, apical 0.45± of flagellum, thoracic sutures, basal 0.3 of second and third tergites, and a pair of narrow basal marks on fourth tergite, black, the black on second tergite almost or quite divided medially; hind tibia infuscate apically; wings dark brown, the front wing with paler areas as in figure 366.

Type: ♀, Coalinga, Calif., Apr. 26, 1950, R. M. Bohart (Davis).

Paratypes: ♀, Alpine Lake, Marin Co., Calif., June 6, 1957, J. A. Chemsak (Berkeley). 2♂, same data as type (Townes). ♂, Fair Oaks, Calif., May 7, 1949, W. F. Ehrhardt (Townes). ♀, San Antonio Valley, Santa Clara Co., Calif., May 27, 1948, R. v. d. Bosch (Townes).

♀, locality unknown, Apr. 23, 1951 (Washington). There is also a female in the Ithaca collection from Dewitt, Ga., collected May 19, 1912. The specimen may be mislabeled.

This species is known from central California.

10. Compsocryptus unicolor, new species

Figure 367

Male: Front wing 10.5 to 11.0 mm. long; temple at midheight about 0.80 as long as eye, weakly convex; punctures on mesopleurum rather coarse, strong, subadjacent to somewhat crowded; basal transverse carina of propodeum weak, indistinct medially; apical transverse carina rather strong, medially absent or indistinct.

Ferruginous. Ocellar area, lower median part of frons, and occiput more or less black; flagellum black, its basal 0.7 brownish fulvous below; more or less extensive sutural marks on thorax black; front and middle legs beyond femora and hind tarsus fulvous; hind tibia weakly infuscate apically; wings dark brown, the costa, basal 0.2± of stigma, and basal 0.6± of subcosta fulvous brown; abdomen without any fuscous marks.

Female: Front wing 10.0 to 12.0 mm. long; temple at midheight about 0.78 as long as eye, weakly convex; second segment of flagellum about 3.5 as long as wide; widest subapical segments of flagellum about 0.62 as long as wide; punctures on mesopleurum small, not strong, moderately close, many of them obscured by irregular longitudinal wrinkling; basal transverse carina of propodeum very weak and indistinct; apical transverse carina strong, its median 0.2± absent or indistinct; hind femur about 5.3 as long as deep; setiferous punctures on most of second tergite separated by 2 to 3 times length of hairs, but on lateral portion of tergite separated by about 0.6 the length of hairs; ovipositor sheath about 0.58 as long as front wing; ovipositor about 5.2 as long from nodus to apex as it is deep at nodus.

Ferruginous. Median part of flagellum usually with a faintly paler fulvoferruginous band; apical 0.45 of flagellum blackish; wings dark brown, the costa, basal 0.5± of subcosta, and basal 0.2 of stigma brownish fulvous; head, thorax, and abdomen without fuscous markings except sometimes in areas at base of front wing, groove at base of scutellum, and grooves at base of propodeum.

Type: ♀, Walker Pass, Kern Co., Calif., June 26, 1949, H. E. Cott (Washington, USNM 63796).

Paratypes: ♂, Coalinga, Calif., May 14, 1938, M. Cazier (Townes). ♀, near Coalinga, Calif., June 8, 1941, R. M. Bohart (Townes). ♂, same data as type (Townes). ♀, San Joaquin Valley, Calif., May 3, 1941, McKittrick (Berkeley).

11. Compsocryptus turbatus (Cresson)

FIGURE 368

Cryptus turbatus Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 363; ♀. Type: ♀, California (Philadelphia).

Male: Front wing 10.0 to 11.0 mm. long; temple at midheight about 0.92 as long as eye, weakly convex; punctures on mesopleurum and metapleurum of moderate size, strong, close, their interspaces about 0.3 their diameter; propodeum as in *C. fletcheri;* areolet usually a little smaller than in *C. fletcheri.*

Colored like male of *C. fletcheri* except that side and under side of thorax is usually mostly black, with only the upper part of pronotum, subtegular ridge, and anterodorsal spot on mesopleurum ferruginous, the metapleurum usually entirely black. Sometimes, however, the side and under side of the thorax is mostly ferruginous, as in typical *C. fletcheri.* The front wing averages a little paler and more distinctly banded than in male of *C. fletcheri.*

Female: Front wing 7.2 to 12.0 mm. long; temple at its midheight about 0.90 as long as eye, weakly convex; second flagellar segment about 3.4 as long as wide; widest subapical segments of flagellum about 0.70 as long as wide; thorax a little stouter than in *C. fletcheri;* punctures of mesopleurum moderately small, sharp, dense, most of their interspaces about 0.3 the diameter of the punctures; basal transverse carina of propodeum absent except for a short vestige behind spiracle; apical transverse carina represented laterally by a rather long, moderately strong, oblique carina; areolet usually a little smaller than in *C. fletcheri;* postpetiole a little wider, more elevated medially, and more mat than in *C. fletcheri;* hairs on second tergite as in *C. fletcheri;* ovipositor sheath about 0.95 as long as front wing; ovipositor about 6.8 as long from nodus to apex as it is deep at nodus.

Coloration as in female of *C. fletcheri.*

This form may prove to be only subspecifically distinct from *C. fletcheri.* A few specimens show tendencies to be intermediate. A series of 3♂, 2♀, from Ten Cent Lake, Steens Mts., Oreg., is particularly indicative of intergradation between the two. We have placed one male of this series under *C. fletcheri,* the rest under *C. turbatus,* but the placement of all four may be arbitrary.

Specimens (13♂, 15♀): From California (Alma, Antioch, Brentwood, Davis, Dos Palos, Helm in "Kings" [Fresno] Co., Linden, Los Gatos Canyon in Mount Diablo Range in Fresno Co., Magnesia [Springs] Canyon in Riverside Co., Mount Diablo, Piru, Pittsburg, Porterville, San Diego, and Woody); Idaho (Payette and Sweet); Oregon (Klamath Falls and Ten Cent Lake (dry) at east side of Steens Mts. near Alberson); and Utah (Newton).

Dates of collection are distributed from April 27 to July 8, with a few outside this range, as follows: March 30 at Woody, Calif.; April 21 on Mount Diablo, Calif.; and July 29 at Ten Cent Lake near Alberson, Oreg.

This species occurs in southern Idaho, northern Utah, southern Oregon, and western California.

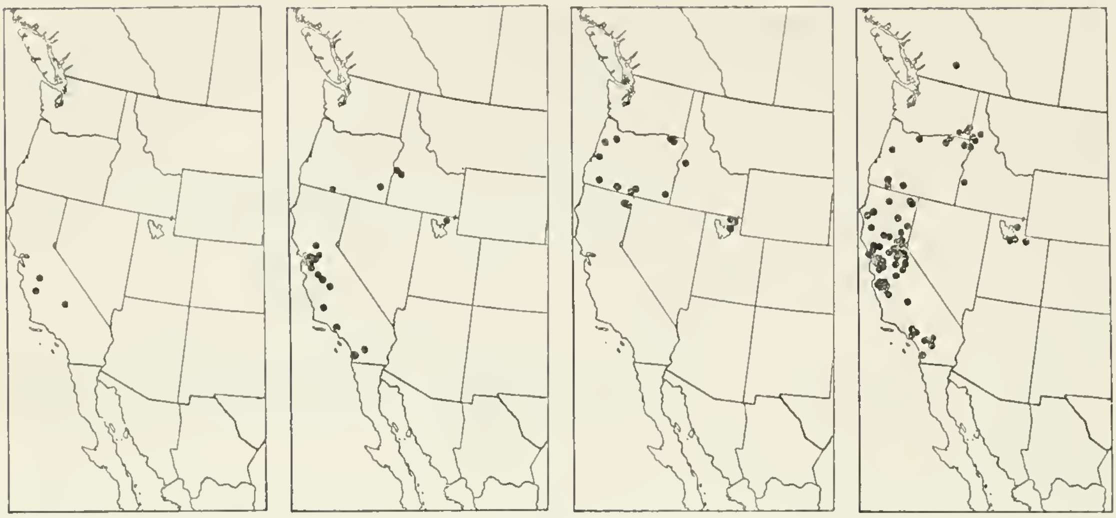
12. Compsocryptus fletcheri (Provancher)

Cryptus Fletcheri Provancher, 1888, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 361; ♀. Type: ♀, Vancouver Island, B.C. (Quebec).

Male: Front wing 9.8 to 11.8 mm. long; temple at midheight about 0.95 as long as eye, very weakly convex; punctures on mesopleurum and metapleurum moderately coarse, strong, separated by about 0.5 their diameter; basal transverse carina of propodeum absent except as a short vestige behind spiracle; apical transverse carina absent or represented by a weak sublateral vestige.

Ferruginous. Center of frons, ocellar area, occiput, often a pair of vertical sublateral stripes on face and connecting bar above clypeus, apical 0.35 of flagellum, and thoracic sutures, black; scape and basal 0.65 of flagellum fulvous brown below, fuscous brown above; often side of thorax largely or mostly black but metapleurum always at least partly pale; coxae often with black markings; hind tibia infuscate apically; front and middle legs beyond femora and hind tarsus fulvous; wings dark brown, sometimes with faint darker brown bands, the costa, basal 0.5± of subcosta, and basal 0.6± of stigma, fulvous brown, the rest of stigma brown; base of third tergite usually with a pair of transverse fuscous marks.

Female: Front wing 8.7 to 11.5 mm. long; temple at its midheight about 1.0 as long as eye, weakly convex; second flagellar segment about 3.5 as long as wide; widest subapical segments of flagellum about 0.80 as long as wide; punctures on mesopleurum of irregular size and density but mostly not crowded and separated on the average by about 0.6 their diameter, the mesopleurum centrally often with some fine longitudinal wrinkling; basal transverse carina of propodeum present only as a short vestige behind spiracle; apical transverse carina represented by a weak oblique lateral carina; hind femur about 4.2 as long as deep; hairs on median and medioapical part of second tergite sparse, elsewhere denser, the hair sockets in the sparser areas separated by about 2.5 the length of the hairs, in the denser areas separated by about the length of the hairs; ovipositor sheath about 0.95 as long as front wing; ovipositor about 6 8 as long from nodus to apex as it is deep at nodus.



FIGURES 159–162.—Localities: 159 (left), *Compsocryptus unicolor;* 160 (center, left), *C. turbatus;* 161 (center, right), *C. fletcheri;* 162 (right), *C. purpuripennis.*

Ferruginous. Apical 0.45 of flagellum infuscate; central part of occiput and sutural markings on thorax black; wings dark brown, the costa, basal 0.5± of stigma, and basal 0.7± of subcosta fulvous brown; basal 0.2 of third tergite fuscous, the fuscous area absent from lateral part of tergite and constricted on midline.

Specimens (12♂, 20♀): From British Columbia (Victoria); California (Buck Creek and Davis Creek in Modoc Co.); Idaho (9 miles southwest of Midvale); Oregon (Blue Mts., Corvallis, Fox Valley, Klamath Falls, Lakeview, Lincoln Mt. at Milton, Medford, Milton, Olene, Ten Cent Lake (dry) near Alberson, and Yoncalla); and Utah (Farr West, Logan, Newton, and "Portageur" (Utah?)).

Dates of collection are distributed from June 23 to July 29, except for the following dates outside of this range: May 25 at Victoria, B.C.; June 1 at Corvallis, Oreg.; and August 20 at Portageur, Utah?.

This species ranges from Vancouver Island to northern California and eastward to northern Utah.

13. Compsocryptus purpuripennis (Cresson)

FIGURE 369

Cryptus purpuripennis Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 364; ♀. Type: ♀, California (Philadelphia).

Male: Front wing 7.5 to 12.5 mm. long; temple at midheight about 1.05 as long as eye, at and a little below its midheight flat or weakly concave, elsewhere very weakly convex; punctures on mesopleurum moderately coarse, separated by about 0.8 their diameter; propodeal carinae as in female.

Ferruginous. Median part of frons and vertex, occiput, area around clypeal fovea, pedicel, all of flagellum, sutural markings on thorax and small marks at apices of coxae, black; hind tibia somewhat infuscate, paler basally; hind tarsus yellowish, its first and last segments fulvous; wings colored as in female; abdomen uniformly ferruginous.

Female: Front wing 7.0 to 11.5 mm. long; temple at midheight about 0.97 as long as eye, at and a little below midheight flat to very weakly convex, elsewhere weakly convex; second flagellar segment about 2.9 as long as wide; widest subapical flagellar segments about 0.62 as long as wide; punctures on mesopleurum rather coarse but of irregular size, separated by about 0.8 their diameter; basal carina of propodeum absent except sometimes for a weak vestige behind spiracle; apical carina of propodeum absent; hind femur about 3.9 as long as deep; second tergite with hair sockets on its basal half and laterally separated by about the length of the hairs, elsewhere much sparser; ovipositor sheath about 0.90 as long as front wing; ovipositor about 6.6 as long from nodus to apex as it is deep at nodus.

Ferruginous. Median part of occiput and narrow margins along the deeper thoracic sutures black; apical half of flagellum fuscous; wings blackish brown, with a weak purple iridescence, the veins and stigma black except that costa, basal 0.3± of subcosta, and extreme base of stigma are ferruginous; legs and abdomen uniformly ferruginous except that second to fourth segments of hind tarsus are somewhat yellowish.

Specimens (199♂, 75♀): From British Columbia (Vernon); California (Antioch, Arroyo Seco Camp in Monterey Co., Ash Mountain in Sequoia National Park at 3,000 to 5,000 ft., Browns Flat in Los Angeles Co., Buck Creek in Modoc Co., California Hot Springs, Camino, "Camp Holsum," Carrville in Trinity Co. at 2,400 to 2,500 ft., Chile Bar in El Dorado Co., Coalinga, 12 miles west of Coalinga, Colfax, Conn Lake in Napa Co., Crystal Lake Road in Los Angeles Co. at 4,700 ft., Dardanelle, Dutch Flat, Eel River in Mendocino Co., Fair Oaks, Fort Seward, Gold Lake in Sierra Co., Hastings Natural History Reservation in Santa Lucia Mts. at Jamesburg in Monterey Co. at 1,900 to 2,700 ft., Hat Creek, Keen Camp in San Jacinto Mts., Lassen Creek in Modoc Co., Livermore, Los Gatos Canyon in Mount Diablo Range in Fresno Co., Madera Co. at 3,000 ft., Mokelumne Hill, Mount Diablo at 2,000 ft., Mount Hamilton in Santa Clara Co., Mount Shasta District, Mount Tamalpais, Nelson Point in Plumas Co., Oakhurst, Paraiso Springs in Monterey Co., Pilot Hill, 4 miles west of Quincy, Ribbonwood in San Jacinto Mts., Richardson Springs, Samuel Springs in Napa Co., San Antonio Valley in Santa Clara Co., San Diego, Sobre Vista in Sonoma Co., Stone Creek in Monterey Co., 8 miles east of Sunnymead, Tanbark Flat in Los Angeles Co., Tuolumne Co. at 3,000 and 3,500 ft., Wildwood Canyon in San Bernardino Co., Woodfords in Alpine Co., and Yankee Hill in Butte Co.); Idaho (Lake Waha, Lewiston at 550 ft., Orofino at 1,016 ft., and Sweet); Oregon (Athena, Corvallis, 10 miles south of The Dalles, Eagle Ridge at Klamath Lake, Griffin Creek in Jackson Co., Hat Point in Wallowa Co. at 7,000 ft., Jackson Co. near Copco in Calif., Milton, and Mormon Gd. [=Guard Station] in Blue Mts.); Utah (Big Cottonwood Canyon in Salt Lake Co., Mantua, Mill Creek Canyon in Salt Lake Co., and Strawberry Daniel Pass); and Washington (Pullman, Tollgate Road in Blue Mts., and Wawawai).

Most dates of collection are from May 15 to July 15. Collections outside of this range are: April 8 at 12 miles west of Coalinga, Calif.; April 26 at Coalinga, Calif.; April 27 in Stone Canyon, Monterey Co., Calif.; April 31 and May 12 at Sobre Vista, Sonoma Co., Calif.; May 5 and 11 at Arroyo Seco Camp, Monterey Co., Calif.; May 9 and 13 at Mount Diablo, Calif.; May 12 at Yankee Hill, Butte Co., Calif.; July 22 at Lassen Creek, Modoc Co., Calif.; July 25 at Buck Creek, Modoc Co., Calif.; August 2 to 5 at San Diego, Calif.; and August 4 at Hat Point, 7,000 ft., Wallowa Co., Oreg.

This species occurs from southern British Columbia to southern California and eastward to Utah. It is adult from late spring to mid-summer.

14. Compsocryptus resolutus (Cresson)

Male: Front wing 7.4 to 11.6 mm. long; temple at midheight about 1.2 as long as eye, moderately convex; clypeus exceptionally wide; mesopleurum with coarse punctures that are separated by about their diameter; propodeal carinae as in female.

Fulvoferruginous with more or less extensive black areas on head, thoracic sutures, pleura, and coxae, the pleura often mostly black; face, clypeus, and orbits mostly yellowish or fulvous; flagellum usually entirely black, but sometimes with most of the basal 0.7± brownish fulvous; hind tibia infuscate toward apex; wings yellowish brown with weak or faint brownish banding; second through fifth tergites, or at least third and fourth tergites with a fuscous basal band, the bands often partly or completely interrupted medially to form two transverse fuscous spots.

Female: Front wing 6.0 to 11.5 mm. long; head, thorax, and legs with exceptionally sparse, irregular-sized punctures from which arise long hairs; temple at midheight about 1.5 as long as eye, moderately convex; second flagellar segment about 2.0 as long as wide; widest subapical segments of flagellum about 0.73 as long as wide; punctures on mesoscutum exceptionally sparse; punctures on mesopleurum rather coarse, separated by about 1.0 to 2.0 their diameter; basal propodeal carina absent except for a short piece laterally; apical carina of propodeum absent; hind femur about 2.7 to 3.2 as long as deep; bristles on tibiae very dense; hair sockets on second tergite separated by about 0.6 to 1.3 the length of the hairs; ovipositor sheath about 0.65 as long as front wing; ovipositor about 6.0 as long from nodus to apex as it is deep at nodus.

Fulvoferruginous with markings on head, thoracic sutures, and bases of coxae black; basal half of flagellum brownish fulvous, the rest fuscous brown; wings varying from brownish yellow with moderately sharp brown bands to rather uniformly brownish; base of second tergite often narrowly infuscate; base of third tergite with a rather narrow black band.

This is a species of the West, with two subspecies as keyed and described below.

MALES

1. Fulvous area on hind orbit usually interrupted briefly at lower corner of eye; banding on front wing weak (fig. 370); punctures on mesoscutum often fine and weak but sometimes a little coarser and stronger; range: Rocky Mountains to Pacific, except southern California.
14a. resolutus subfasciatus, new subspecies

Fulvous area on hind orbit continued narrowly around lower corner of eye; banding on front wing very weak or indistinct (fig. 372); punctures on mesoscutum fine and weak; range: central and southern California.
14b. resolutus resolutus (Cresson)

FEMALES

1. Front wing distinctly banded (fig. 371); punctures on thorax and hind femur averaging a little denser, those near front end of notaulus separated by about 0.5 to 1.5 their diameter; range: Rocky Mountains to Pacific, except southern California . . . . . **14a. resolutus subfasciatus,** new subspecies

Front wing brown, only faintly banded (fig. 373); punctures on thorax and hind femur averaging a little sparser, those near front end of notaulus separated by about 1.5 to 2.5 their diameter; range: Southern California.
14b. resolutus resolutus (Cresson)

14a. Compsocryptus resolutus subfasciatus, new subspecies

FIGURES 370; 371

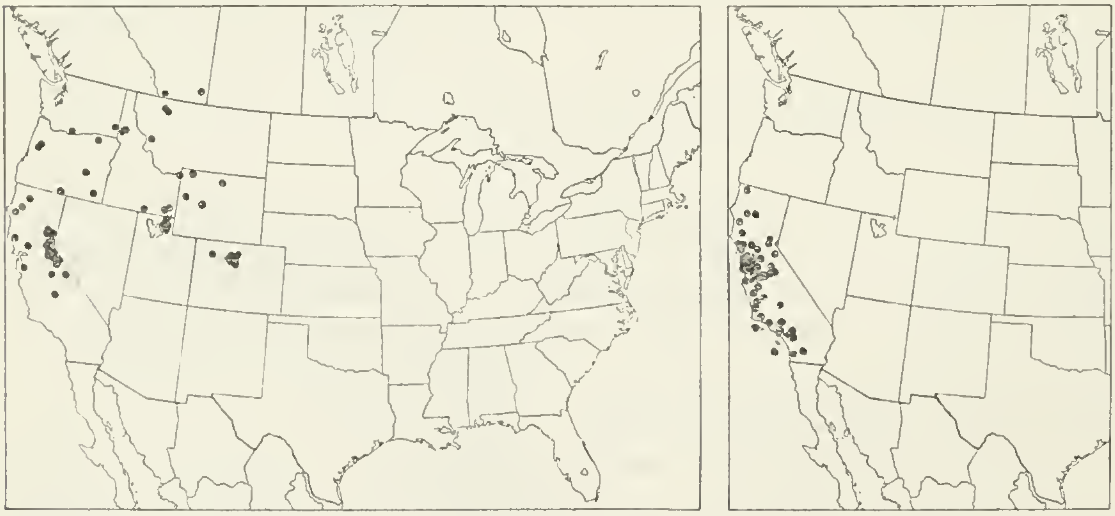
Compared with the subspecies *resolutus* the punctation is a little denser, especially in female, on mesoscutum, mesopleurum, and hind femur, the punctures near front end of notaulus of female separated by about 0.5 to 1.5 their diameter, the punctures on mesopleurum of female separated by about 1.2 their diameter; hind femur of female about 3.0 as long as deep.

Fulvous on hind orbit of male usually interrupted briefly at lower corner of eye; flagellum of male entirely black; wings of male with weak banding, as in figure 370, of female with moderately distinct bands, as in figure 371.

This subspecies is far from uniform in structure and it would seem possible to distinguish numerous local races. Specimens from Montana and vicinity have the punctation unusually dense and the hind femur unusually slender. In specimens from drier areas of Oregon and southern Washington, the punctation and hairs of female (especially on hind femur) are very dense and the wings unusually pale. In central California it intergrades freely with the subspecies *resolutus.*

Type: ♀, Hope Valley, Alpine Co., Calif., July 9, 1948, C. Chan (Washington, USNM 63797).

Paratypes (97♂, 56♀): From Alberta (Cypress Hills and Red Rock Canyon in Waterton Park); California (Bishop in Inyo Co., Boca, Camino, Carnelian Bay on Lake Tahoe, Carrville in Trinity Co. at 2,400 to 2,500 ft., Cupertino, Dardanelle, Exeter, Fort Seward, Gold Lake in Sierra Co., Hope Valley in Alpine Co., 5 miles southwest of Jamestown, Lake Forest near Lake Tahoe, Leavitt Meadow in Mono Co., Mix Canyon in Solano Co., Mount Hamilton River in Santa Clara Co., mountains west of "Nieubieber" in Shasta Co., "Ryan Creek" in Mendocino Co., Sagehen near Hobart Mills, Sardine Creek in Mono Co. at 8,500 ft., 4 miles north of Silver Lake, Stillwater Cove in Sonoma Co., Strawberry in Tuolumne Co., Trinity River Camp in Trinity Co., and Truckee); Colorado (Estes Park Village, Grand Lake, Longs Peak Inn at 9,000 ft., Moraine Park in Rocky Mountain National Park, Pinecliffe, Rabbit Ears Pass at 9,000 ft., and Tolland at 8,890 ft.); Idaho (Montpelier, Moscow, Oakley at 4,542 ft., Paris at 6,000 ft., Targhee Pass, and Troy at 2,475 ft.;) Montana (near Georgetown, St. Mary, and St. Marys Lake in Glacier Park); Oregon (Alpine, Corvallis, Fish Lake in Steens Mts. at 7,000 and 7,500 ft., Lakeview, Milton, and Seneca); Utah (Logan,



Figures 163, 164.—Localities: 163 (left), *Compsocryptus resolutus subfasciatus;* 164 (right), *C. r. resolutus.*

Logan Canyon in Cache Co., Mantua, and Ogden Canyon at Huntsville); Washington (Pullman and Warwick in Klickitat Co.); and Wyoming (Big Horn, Camp Roosevelt in Yellowstone Park, Green River Lakes, and Jackson at 6,300 ft.).

Dates of collection are mostly from May 1 to July 23. Dates outside of this range are: April 12 at Cupertino, Calif., and at Ryan Creek, Mendocino Co., Calif.; April 14 in Mix Canyon, Solano Co., Calif.; April 25 at Corvallis, Oreg.; April 26 at Mount Hamilton River, Santa Clara Co., Calif.; July 26 near Georgetown, Mont.; August 4 in Targhee Pass, Idaho; and August 6 at Grand Lake, Colo.

This subspecies ranges from northwestern Colorado to central California and northward to southern Alberta. It is adult from late spring to mid-summer.

14b. Compsocryptus resolutus resolutus (Cresson)

FIGURES 372; 373

Cryptus resolutus Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 363; ♂. Type: ♂, California (Philadelphia).

Cryptus Edwardii Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 363; ♀. Lectotype: ♀, California (Philadelphia).

Compared with the subspecies *subfasciatus* the punctation is a little sparser, especially in female, on mesoscutum, mesopleurum, and hind femur, the punctures near front end of notaulus of female separated by about 1.5 to 2.5 their diameter, the punctures on mesopleurum separated by about 1.5 their diameter; hind femur of female about 2.8 as long as deep.

Fulvous on hind orbit of male continued narrowly around lower corner of eye; flagellum of male usually entirely black but sometimes its basal 0.7± mostly brownish fulvous; wings brown, paler in male than in female, with faint banding in both sexes, as in figures 372 (♂) and 373 (♀).

Specimens (38♂, 48♀): From California (Arroyo Seco in Monterey Co., Atascadero, Ben Lomond, Berkeley, Clarksburg, Coalinga and 12 and 15 miles west of Coalinga, Colfax, Davis, Deep Creek in San Bernardino Co., Del Puerto Canyon in Stanislaus Co., Dutch Flat, Eagle Rock, Exeter, Hollister, Hopland Field Station in Mendocino Co., Horse Creek, Jacalitos Canyon at Coalinga, Keen Camp in San Jacinto Mts., Kernville, Los Angeles, Los Trancos Creek 5 miles west of Menlo Park in San Mateo Co., Marin Co., Mendota, Middle Ranch on San Clemente Island, Mount Diablo and Russelmann Park on Mount Diablo, Mount Hamilton, New Cuyama, Pacific Grove, 6 miles west of Palmdale at Mint Canyon, Palo Alto, Pasadena, Pleyto in Monterey Co., Putah Canyon in Yolo and Solano Cos., Riverside, San Ardo, San Clemente Island, San Diego, San Francisco, Santa

Clara Valley, Santa Rosa Island, Shingletown, Skaggs [Springs], Stanford University, Stillwater Cove in Sonoma Co., Stone Canyon in Monterey Co., Templeton, Trinity Camp in Trinity Co., Ventura, Volcano, Walnut Creek, Warner Springs, Wawona in Mariposa Co., Willits, and Woodlake).

Dates of collection are mostly from April 8 to the end of May. Those outside of this range are: March 18 in Jacalitos Canyon at Coalinga, Calif.; March 20 in Riverside Co., Calif.; March 22 at Templeton, Calif., and in Stone Canyon, Monterey Co., Calif.; March 23 at San Ardo, Calif.; June 2 at Shingletown, Calif.; June 5 at Atascadero, Calif.; and June 9 at Davis, Calif., and at Willits, Calif.

This subspecies occurs in California. It is adult from spring to early summer.

14. Genus Joppidium

Figure 315,a

Joppidium Cresson, 1872, Trans. American Ent. Soc., vol. 4, p. 160. Type: *Joppidium rubriceps* Cresson; designated by Viereck, 1914.

Joppoceras Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, pp. 39, 40. Type: "*Cryptus*" (=*Joppidium*) *dubiosum* Cresson; original designation.

Opisoxestus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 40. Type: *Opisoxestus ferrugineus* Ashmead; original designation.

Isocryptus Brèthes, 1927, Ent. Mitt., vol. 16, p. 308. New synonymy. Type: (*Isocryptus azureus* Brèthes) = *moerens* (Perty); monobasic.

Front wing 6.0 to 16.0 mm. long; body slender; frons unarmed; clypeus moderately large, moderately convex, its apical margin weakly convex, without a median tooth; subapical portion of female flagellum widened, flattened below; mesoscutum moderately convex, polished, with dense punctures that are usually fine and weak but sometimes moderately coarse and strong; notaulus usually sharp and reaching beyond center of mesoscutum but in the Moerens group the notaulus weak and shorter; epomia rather strong; propodeum in profile rather weakly convex; basal transverse carina of propodeum usually strong and complete but sometimes obsolescent; apical transverse carina of propodeum present or absent, or represented by a pair of almost horizontal, sublateral crests; wings of all Nearctic species black or dark brown, of some Mexican species heavily banded with yellow and dark brown; areolet large, quadrangular or broadly pentagonal; ramellus absent; nervulus distad of basal vein; nervellus broken at or below the middle; axillus long, strongly divergent from anal margin, a little closer to submediella than to anal margin; first abdominal segment slender, weakly decurved, terete, without longitudinal carinae or sometimes with a dorsolateral carina, with or without a small basolateral triangular tooth, its spiracle beyond the middle but rather far from the apex, the postpetiole only weakly expanded, 1.5 to 2.0 as long from spiracle to apex as it is wide; second tergite polished, its punctures fine, weak, rather dense; tergite 7 not marked with white; ovipositor sheath about 0.60 as long as front wing; ovipositor slender, cylindric, weakly upcurved, its tip long and slender.

Joppidium is a relatively small genus, ranging from central United States to central Argentina. Mexico has the largest number of species. Adults occur characteristically in open weedy places, flying in strong sunlight. They are rather frequently taken on flowers and at honey dew. None of the species has been reared.

The genus may be divided into three species groups. Two of the groups occur within our limits. A description of the third is included to make a more complete treatment of the subdivisions of the genus. The exotic species are listed under their species groups. *Joppidium annulicorne* Ashmead 1895, described from Baja California, Mexico, is not a *Joppidium.* It belongs in the Ichneumoninae.

Key to the species groups and to the Nearctic species of Joppidium

1. Upper tooth of mandible about half as long as lower tooth; first tergite of female with a weak dorsolateral longitudinal carina; apical carina of propodeum distinct, interrupted medially. BROCHUM GROUP (p. 307) 2
Upper tooth of mandible about equal in length to lower tooth; first tergite of female without a dorsolateral longitudinal carina 3

2. Propodum black or brown; hind tibia yellow . . . . **1. brochum,** new species
Propodeum ferruginous; hind tibia fulvoferruginous to brownish ferruginous. **2. fuscipenne** (Brullé)

3. Mesopleurum and propodeum with more or less distinct wrinkles, medium sized or coarse punctures, or both; apical carina of propodeum absent or indistinct; lower half of frons with a median pair of carinae or group of wrinkles that are ventrally vertical and parallel, more dorsally curved outward above each antennal socket. RUBRICEPS GROUP (p. 311) 4
Mesopleurum and propodeum without wrinkles or coarse punctures; apical propodeal carina represented by two transverse tubercles; lower half of frons smooth, without wrinkles or carinae. MOERENS GROUP. (p. 318) (Not Nearctic)

4. Body ferruginous 5
Body black, blackish, or largely blackish 6

5. Hind tibia yellowish, fulvous on base and apex; mesopleurum of male mostly smooth; metapleurum of female largely wrinkled but its front 0.3 ± punctate and almost smooth . . . . **3. arizonicum,** new species
Hind tibia ferruginous or fuscoferruginous, not at all yellow; mesopleurum of male mostly wrinkled; metapleurum of female entirely wrinkled. **4. densum,** new species

6. Hind tibia blackish . . . . **6. rubriceps** Cresson
Hind tibia yellow 7

7. Propodeum beyond basal carina with coarse, dense punctures, without transverse wrinkles but in males usually with some longitudinal wrinkles; fourth and following tergites of female light brown . . . . . . **7. apicale** Cresson

Propodeum beyond basal carina not as above, with strong transverse wrinkles, or in males of *dubiosum* with only fine punctures and weak wrinkles; fourth and following tergites of female black 8

8. Metapleurum covered with dense punctures and oblique wrinkles; propodeum beyond basal carina entirely covered with dense wrinkles. **5. discolor,** new species

Metapleurum with fine, moderately sparse punctures and in female with a few weak wrinkles; propodeum beyond basal carina only partly wrinkled, at least the part next to the carina smooth . . . . . **8. dubiosum** Cresson

I. BROCHUM GROUP

Lower half of frons with a weak median longitudinal groove, without carinae or wrinkling; upper tooth of mandible about half as long as lower tooth; notaulus sharp; mesopleurum with longitudinal wrinkling, this wrinkling usually poorly developed in smaller males; basal transverse carina of propodeum complete and strong; apical transverse carina of propodeum well developed, interrupted medially; propodeum transversely wrinkled, rather strongly wrinkled in female, weakly in male; first tergite of female with a distinct dorsolateral longitudinal carina, strongest near the spiracle.

This group includes the two species treated below and two undescribed species in Mexico.

1. Joppidium brochum, new species

Front wing 6 to 12.7 mm. long; scutellum with a lateral carina on its basal 0.4±; mesopleurum of male with rather weak irregular-sized punctures that are separated by about 1.5 their diameter, and rather weak longitudinal wrinkling that covers about 30% of its surface; mesopleurum of female with strong, regular longitudinal wrinkles that cover about 90% of its surface, in the unwrinkled areas with some small punctures; metapleurum of male with rather small punctures that are separated by about 1.7 their diameter, its lower 0.2 to 0.5 with some longitudinal wrinkles; metapleurum of female entirely covered with strong oblique wrinkles; propodeum of male beyond the basal carina covered with wrinkles of irregular strength and direction; propodeum of female beyond basal carina covered with strong, transverse wrinkles that are irregular next to the apical carina.

There are two subspecies, one in the southeastern United States, the other in Oklahoma, Texas, and Mexico.

1. Mesoscutum and pronotum brownish ferruginous; thoracic punctures and wrinkles averaging finer and weaker; range: Oklahoma, Texas, and Mexico. **1a. brochum brochum,** new subspecies

Mesoscutum and pronotum blackish or reddish brown; thoracic punctures and wrinkles averaging coarser and stronger; range: southeastern United States . . . . **1b. brochum fattigi,** new subspecies

1a. Joppidium brochum brochum, new subspecies

Black, with black wings. Head, mouth parts, scape, pedicel, pronotum, propleurum, front legs, mesoscutum, scutellum, usually postscutellum, tegula, and front 0.5± of mesopleurum and mesosternum, ferruginous; flagellum of male dark brown, with a yellowish band that covers about 9 segments; basal three segments of female flagellum light reddish brown, the apex of third segment yellow; fourth to about the eleventh segments of female flagellum light yellow, the following segments blackish; middle coxa and trochanters brown; middle femur fulvous brown; middle and hind tibiae and tarsi yellow, the tarsi brownish apically; hind coxa, trochanters, and femur blackish, the extreme apex of femur tinged with fulvous; apex of first tergite with a brown tinge; second and following tergites fuscous and brown in male (the fuscous mostly on basal half of the tergites), brown in female, the bases of the second and third tergites with fuscous tinges.

A short series from Flint, Oklahoma, is somewhat intermediate to the subspecies *fattigi*.

Type: ♂, New Braunfels, Tex., June 27, 1917 (Washington, USNM 63798).

Paratypes (35♂, 7♀): From Oklahoma (Flint); Texas (Brownsville, Del Rio, Fort Sam Houston in Bexar Co., Hidalgo Co., New Braunfels, and Salado Creek in Bexar Co.); and Mexico (Cuitlahuac in Vera Cruz, El Limon and 22 miles north of El Limon in Tamaulipas, El Salto in San Luis Potosí at 1,700 ft., Huichihuyan 20 miles north of Tamazunchale in San Luis Potosí, Jalapa in Vera Cruz, Pachuca in Hidalgo, Poza Rica in Vera Cruz, Puente Nacional in Vera Cruz, Salto Falls in San Luis Potosí at 1,250 ft., San Rafael near Jicoltepec in Vera Cruz, 30 miles north of Tamazunchale in San Luis Potosí at 300 ft., Vallecillo in Nuevo Leon, Valles, and Xilitla at 3,500 ft.).

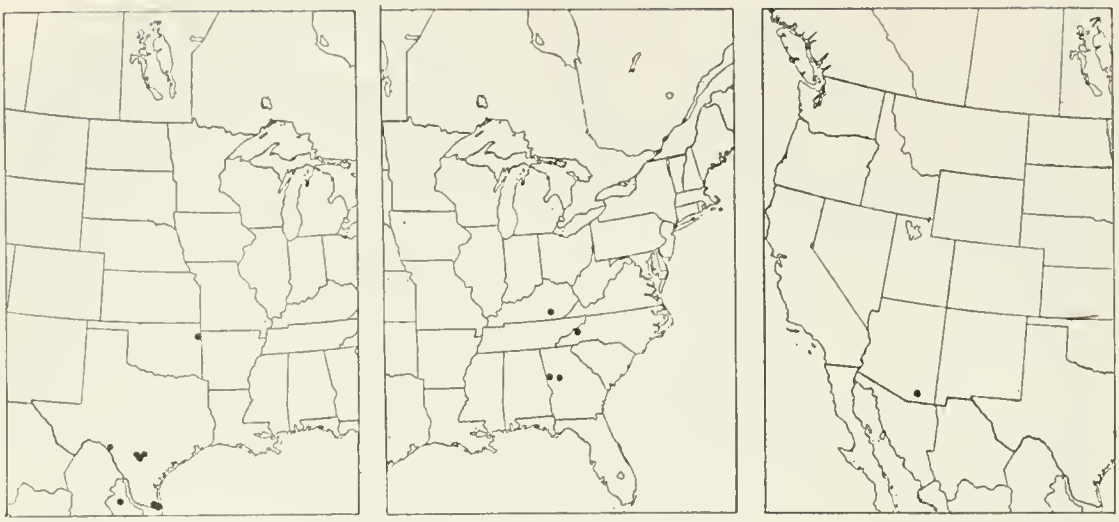
Texas and Oklahoma specimens were collected mostly from May 11 to June 27. Those outside of this range are: March 24 at Fort Sam Houston, Tex., and April 27 at Del Rio, Tex. Mexican specimens have been collected in the months of May, June, July, August, and October.

This subspecies occurs in Oklahoma, Texas, and Mexico.

1b. Joppidium brochum fattigi, new subspecies

Male: Structurally similar to male of the subspecies *brochum* except that the sculpture averages a little coarser and stronger.

Black, with black wings. Head, mouth parts, scape, pedicel, and front legs, fulvous brown; flagellum dark brown, with a yellowish band that covers about 12 segments; front half of thorax predominantly blackish but with ferruginous tinges; middle and hind legs, and abdomen colored as in male of *J. brochum* but a little darker.



Figures 165–167.—Localities: 165 (left), *Joppidium brochum brochum;* 166 (center), *J. b. fattigi;* 167 (right), *J. fuscipenne.*

Female: Similar to male except for the usual sexual differences.

Type: ♂, Stone Mt., Ga., June 13, 1929, P. W. Fattig (Washington, USNM 63799).

Paratypes: ♂, Rockmart, Ga., June 5, 1949, P. W. Fattig (Townes). 4♂, Stone Mt., Ga., May 8, 1929, June 6, 1928, June 21, 1927, and June 26, 1927, P. W. Fattig (Washington and Townes). ♂, Rockcastle Co., Ky., Aug. 1, 1947, Dreisbach and Bullock (Dreisbach). ♀, Hot Springs, N.C., A. T. Slosson (New York).

This subspecies occurs in the Carolinian zone of the southeastern United States.

2. Joppidium fuscipenne (Brullé)

Cryptus fuscipennis Brullé, 1846, *In* Lepeletier, Histoire naturelle des insectes, hyménoptères, vol. 4, p. 189; ♀. Type: ♀, Mexico (Paris).

Joppidium donabilis Cresson, 1873, Proc. Acad. Nat. Sci. Philadelphia, vol. 1873, p. 139; ♂, ♀. New synonymy. Lectotype: ♀, Cordova, Mexico (Philadelphia).

Joppidium yucatanense Cameron, 1885, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 211; ♀. New synonymy. Type: ♀, Valladolid, Yucatan, Mexico (London).

Front wing 7.5 to 12.5 mm. long; structurally similar to *J. brochum brochum* except that general build is a little more slender, and horizontal wrinkling on thorax averages a little finer and more regular in both sexes, punctures on thorax are finer, metapleurum of male with wrinkles, and propodeum of male with little if any wrinkling.

Fulvoferruginous, with blackish brown wings. Flagellum blackish, in the female ferruginous basally below, in both sexes with a yellowish white median band; front and middle tibiae yellowish fulvous; front and middle tarsi yellowish fulvous, their first segments mostly yellowish and their fifth segments brownish ferruginous; first segment of hind tarsus yellow, its base and apex usually fulvoferruginous; second segment of hind tarsus yellow, fulvoferruginous basally and apically; third segment of hind tarsus often tinged with yellow; last segment of hind tarsus infuscate apically; tergite 2 usually with a basosublateral infuscate area; base of tergite 3 usually infuscate.

We are indebted to Dr. J. Aubert in Paris for comparing specimens with the type of *fuscipennis*.

Specimens (33♂, 19♀): From Arizona (Huachuca Mts.); and Mexico (Alpuyeca in Morelos, 3 miles north of Chopala on Guadalajara Road in Jalisco, Cocula at 4,450 ft. in Jalisco, 9 miles south and 10 miles west of Colima in Colima, 3 miles east of Comitan in Chiapas, Cuernavaca, Cuernavaca area at 4,000 to 5,000 ft., 45 miles south of Cuernavaca in Morelos, El Molino in Jalisco, 25 miles west of Guadalajara in Jalisco, Guanajuato in Guanajuato, Homoquilera in Jalisco, Hujintlan in Morelos, Joyutla in Morelos, Manzanillo, Matamoros in Puebla, 70 miles south of Mazatlan (Las Palmillas) in Sinaloa, Mexcola in Guerrero, kilo 78–R15 in Nayarit, 26 miles south of Puebla at 5,600 ft. in Puebla, 46 miles south of Puebla at 4,200 ft. in Puebla, Rio Verde in Jalisco, Rosamorada in Nayarit, San Blas in Nayarit, Tamazula in Jalisco, Tancitaro at 6,586 ft. in Michoacan, Tehuantepec in Oaxaca, 15 miles north of Tepec in Nayarit, Tequila at 4,200 ft. in Jalisco, Tocolopa in Colima, and Tuxpan and Tuxpan at 6,300 ft. in Michoacan). Complete data on the Arizona record is: ♂, Huachuca Mts., Ariz., Aug. 19, 1950, D. J. and J. N. Knull (Columbus).

This species is widely distributed and very common in Mexico, and has been taken once in southern Arizona.

II. RUBRICEPS GROUP

Lower half of frons with a median pair of carinae or group of wrinkles that are vertical and parallel ventrally, more dorsally curved outward above each antennal socket; upper tooth of mandible about the same length as lower tooth; notaulus sharp; mesopleurum with fine to coarse punctures, usually also with longitudinal wrinkling, this wrinkling poorly developed in smaller males; basal transverse carina of propodeum complete, incomplete, or absent; apical transverse carina of propodeum absent or indistinct; propodeum very finely to coarsely punctate, usually with wrinkling that is more or less transverse; first tergite of female without a dorsolateral longitudinal carina.

This group includes the six species treated below and five additional species ranging from Mexico to northern South America. The extralimital five comprise three undescribed species, *Joppidium ardens* Cresson 1873 (=*Joppidium ruficolle* Cameron 1885), and *Joppidium coerulipenne* Cameron 1885 (=*Opisoxestus ferrugineus* Ashmead 1900). The synonymy is new.

3. Joppidium arizonicum, new species

Male: Front wing 9.8 to 12.5 mm. long; mesopleurum of male with fine, weak, moderately sparse punctures and traces of longitudinal wrinkling that occupy about 10% of its surface; mesopleurum of female with close oblique wrinkling on about 70% of its surface, the rest with fine, rather weak punctures; metapleurum of male smooth, with fine, weak punctures that are separated by about 2.0 their diameter; metapleurum of female with fine, moderately strong punctures that are separated by about 1.5 their diameter, these overlaid by moderately close, oblique wrinkles on about 75% of the area; basal carina of propodeum complete and sharp; propodeum beyond basal carina in male with rather coarse transverse wrinkles on apical half, the basal half smooth except for rather sparse, weak punctures; propodeum beyond basal carina in female with sharp, regular, transverse wrinkles all over.

Ferruginous, the wings black. Flagellum of male light reddish brown, with a yellowish band that occupies about four segments; basal 3.4 flagellar segments of female reddish brown, the next 6.6 segments pale yellow, the rest black; front and middle tibiae and tarsi yellow with a faint fulvous tinge, the tarsi fulvous apically; hind tibia yellow, its basal 0.11± and apical 0.18± fulvous; hind tarsus yellow, the incisures and the apical two segments fulvous.

Female: Unknown.

Type: ♂, Sabino Basin, Santa Catalina Mts., Ariz., September 12, C. H. T. Townsend (Washington, USNM 63800).

Paratypes: ♂, Huachuca Mts., Ariz., Aug. 7, 1924, E. P. Van Duzee (San Francisco). ♂, Redington, Ariz., W. Barnes (Washington).

4. Joppidium densum, new species

Front wing 11 to 14 mm. long; mesopleurum and metapleurum of male with medium-sized, mostly weak punctures that are separated by about their diameter, about 35% of their surfaces covered with rather fine longitudinal wrinkles; mesopleurum and metapleurum of female with moderately dense punctures that are in most places obscured or obliterated by dense, rather fine, longitudinal wrinkles, the wrinkles covering all of metapleurum and about 85% of mesopleurum; basal carina of propodeum complete and sharp; propodeum beyond basal carina covered with transverse wrinkles that are denser, finer, and more regular in female than in male.

Ferruginous, the wings black. Flagellum of male blackish with a yellowish band that occupies about four segments; flagellum of female with first four segments reddish brown, the next 6± yellowish, the rest black; more or less of deeper thoracic sutures and protected areas on lower part of thorax, blackish; front and middle tibiae and tarsi yellowish fulvous; hind tibia ferruginous, sometimes weakly infuscate, especially toward apex; first two segments of hind tarsus yellow, ferruginous at base and apex; base of second and third tergites of male and often apical part of tergites 3–6 of male more or less infuscate.

This species is structurally very similar to *Joppidium ardens* Cresson of Mexico, and though it is quite different in color, it may prove to be only subspecifically distinct. So far, no specimens of intermediate coloration are known.

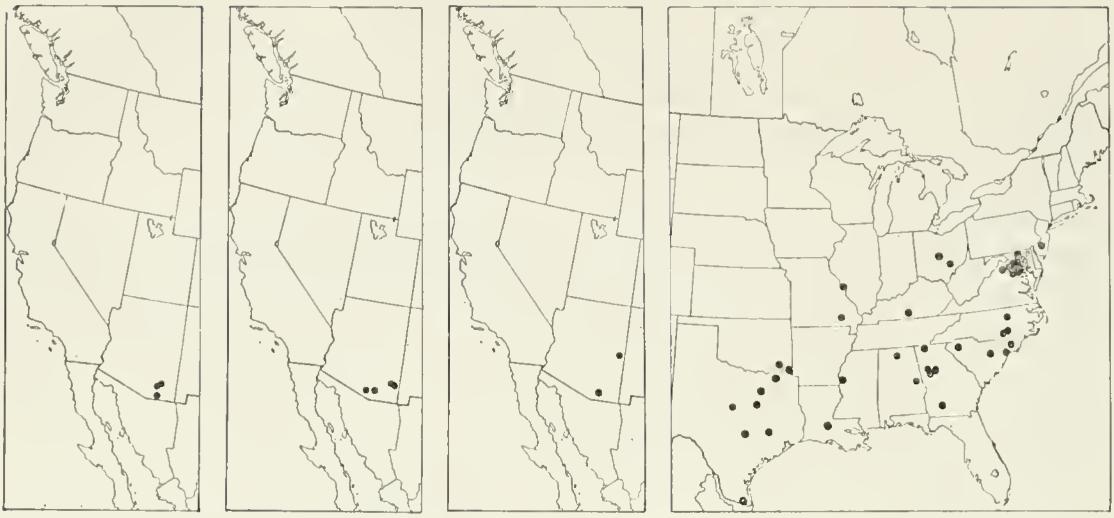
Type: ♀, Chiricahua Mts., Ariz., Sept. 29, 1947, D. J. and J. N. Knull (Washington, USNM 63801).

Paratypes: ♀, Baboquivari Mts., Ariz., F. H. Snow (Lawrence). 2♂, 2♀, Chiricahua Mts., Ariz., July 26, 1952, Sept. 5 and 19, 1947, D. J. and J. N. Knull (Townes and Columbus). ♀, Florida Canyon, Santa Rita Mts. at 4,000 ft., Ariz., July 31, 1946, H. E. Evans (Ottawa). ♂, 5 miles west of Portal, Chiricahua Mts., Ariz., Aug. 28, 1958, P. A. Opler (Berkeley). ♂, 13 kilometers south of Canutillo, Durango, Mexico, Aug. 9, 1951, H. E. Evans (Townes). ♂, 10 kilometers north of Nombre de Dios, Durango, Mexico, Aug. 5, 1951, H. E. Evans (Townes). 2♀, 15 kilometers east of Sombrerete, Zacatecas, Mexico, July 28 and 30, 1951, P. D. Hurd (Berkeley).

5. Joppidium discolor, new species

Male: Front wing 15.5 to 16.0 mm. long; mesopleurum and metapleurum with rather small, sharp punctures that are separated by about 0.5 their diameter, with some fine, weak, irregular, longitudinal wrinkling that occupies about 35% of their area; basal carina of propodeum complete and sharp, beyond which the propodeum is completely covered with sharp transverse wrinkles with some interspersed small, sharp, irregular punctures.

Head and mouth parts fulvous brown, the occiput and median part of frons brown; scape, pedicel, and first 8 or 9 segments of flagellum fulvous; segments 10 to about 20 light yellow, beyond which the flagellum is darkened, the apical segments blackish; thorax dark reddish brown with some indefinite areas fuscous; front coxa light brown; front and middle femora and trochanters fulvous; all tibiae and tarsi yellow; middle coxa dark brown; hind coxa blackish brown; hind first trochanter dark brown; hind second trochanter and femur medium brown, the apex of femur yellowish; wing color variable, in the type yellowish brown with apical part of both wings and hind part of hind wing infuscate, in the paratype blackish with brown costa and stigma; abdomen of type brownish yellow, the first sternite and base of first three tergites dark brown, the first tergite mostly medium brown with its apex paler; abdomen of paratype similar to



Figures 168–171.—Localities: 168 (left), *Joppidium arizonicum;* 169 (center, left), *J. densum;* 170 (center, right), *J. discolor;* 171 (right), *J. rubriceps.*

that of type but somewhat darker and with more extensive brown areas.

Female: Unknown.

The type and paratype belong to different color races. Whether or not they should be considered separate subspecies should be decided after more specimens are available. The type has the kind of coloration characteristic of a number of Hymenoptera in southern Colorado and northern Arizona and New Mexico, including *Labena grallator ochreata, Polistes canadensis navajoe, Mischocyttarus flavitarsis navajo,* and *Trogus flavipennis.* The paratype has a coloration more normal for the genus *Joppidium.*

Type: ♂, Springerville, Ariz., Aug. 24, 1935, T. H. and G. G. Hubbell (Ann Arbor).

Paratype: ♂, Santa Rita Mts., Ariz., Aug. 18, 1935, E. I. Beamer (Lawrence).

6. Joppidium rubriceps Cresson

Joppidium rubriceps Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 160; ♂, ♀. Lectotype: ♀, Bosque Co., Tex. (Philadelphia).

Front wing 9.5 to 12.5 mm. long; mesopleurum with about 70% of its area covered with rather fine wrinkles of irregular strength, mostly somewhat oblique, the rest of mesopleurum with moderate sized punctures that are rather strong and close, but irregular in both strength and spacing; metapleurum with coarse strong punctures, separated by about 0.6 their diameter in male, by about 0.3 their diameter in female, the hind half of metapleurum with weak, irregular wrinkling between the punctures; basal carina of propodeum complete and sharp; propodeum beyond basal carina with irregular wrinkling, finer and denser in female than in male, in male without a strong directional tendency, in female mostly transverse.

Black, with black wings. Head, mandible, scape, and pedicel fulvo-ferruginous, in male the occiput, vertex, and central part of frons fuscous, in female the occiput and ocellar area weakly infuscate; palpi fuscous or brown; flagellum of male yellow, its apex a little darkened; flagellum of female fulvous yellow, its apical third blackish; thorax with ferruginous blotches and tinges of variable extent, especially anteriorly; front and middle coxae and trochanters light to dark brown; front and middle femora fulvous, more or less brownish basally; front and middle tibiae and tarsi fulvous, the tarsi brown apically; hind tarsus yellow, the last two segments and extreme base of first three segments fulvous to fuscous.

This is the only Nearctic *Joppidium* with the hind tibia blackish.

Specimens (34♂, 36♀): From Alabama (Decatur and Pyriton in Clay Co.); District of Columbia; Georgia (Atlanta, Austell, De Witt, Stone Mountain, and Tilton); Kentucky (Crailhope); Louisiana (Opelousas); Maryland (Cabin John, College Park, Glen Echo, Laurel, Ruxton, Takoma Park, and near Waldorf); Mississippi (Greenville); Missouri (Overland and Van Buren in Ozark Mts.); New Jersey (Iona); North Carolina (Aberdeen, Elizabethtown, Raleigh, and Southern Pines); Ohio (Athens and Franklin Co.); Oklahoma (Antlers and Idabel); South Carolina (Florence, Greenville, and Horry Co.); Texas (Austin, Brownsville, Brownwood, College Station, Dallas, and Paris); and Virginia (Alexandria, Falls Church, Glencarlyn, Limeton, and Newington).

Dates of collection are from mid-spring to mid-fall. The earliest and latest dates are: March 20 at Brownsville, Tex.; March 24 at College Station, Tex.; March 29 at Paris, Tex.; April 21 at Southern Pines, N.C.; April 23 at De Witt, Ga.; May 7 at Athens, Ohio; October 8 at Limeton, Va.; October 21 at Dallas, Tex.; October 28 in District of Columbia; and November 10 at Greenville, Miss., and at College Station, Tex.

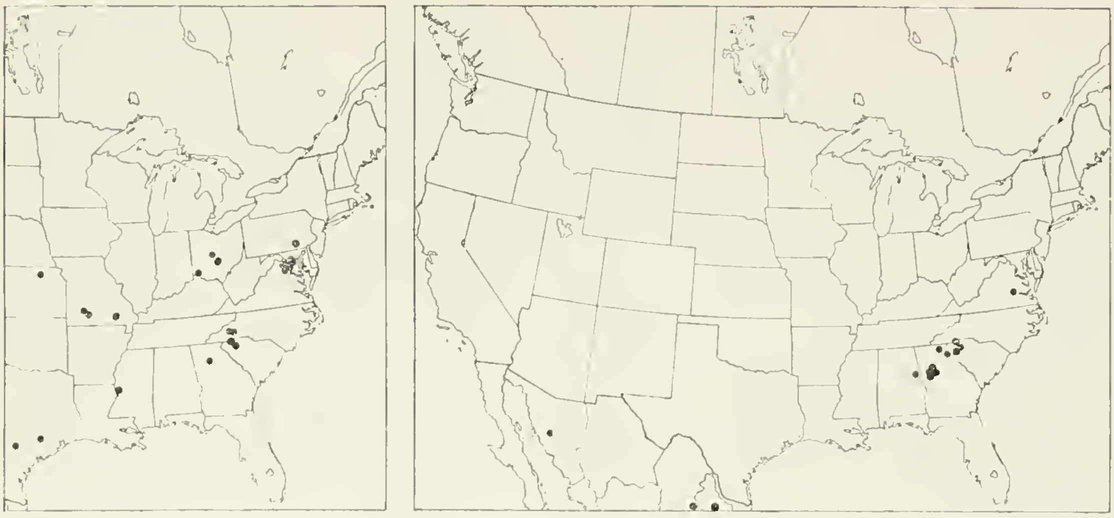
This species occurs in the Carolinian and Austroriparian faunas.

7. Joppidium apicale Cresson

Joppidium apicale Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 160; ♀. Type: ♀, Comal Co., Tex. (Philadelphia).

Joppidium ruficeps Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 70; ♂, ♀. Types: ♂, ♀, Illinois? (destroyed in Chicago fire of 1871).

Front wing 7.5 to 12.0 mm. long; mesopleurum, metapleurum, and propodeum beyond basal carina with coarse, strong, regular punctures that are separated by about 0.3 their diameter, in some places more crowded and on propodeum of female a little sparser; wrinkling absent



FIGURES 172, 173.—Localities: 172 (left), *Joppidium apicale;* 173 (right), *J. dubiosum.*

from mesopleurum, metapleurum, and propodeum except sometimes for weak wrinkling on mesopleurum of female and propodeum of male; basal carina of propodeum complete, usually strong and sharp but sometimes weak and blunt.

Black, with black wings. Head, mouth parts, and scape fulvoferruginous, the occiput, vertex, and central and lower parts of frons more or less brown or fuscous, especially in male; pedicel fulvous, dark brown above; flagellum of male yellow, its apex a little darkened; flagellum of female yellow, its basal two or three segments fulvous and its apical 0.4 black; front and middle coxae dark brown; front and middle trochanters fulvous brown; front and middle femora fulvous; all tibiae and tarsi yellow, the tarsi tinged with brown apically; hind femur blackish brown, its apex tinged with yellow; apex of first two tergites of male and basal half of second and following tergites of male obscure dark brown; apical margin of second tergite of female, apical part of third tergite of female, and all of fourth and following tergites of female brown.

This is the only Nearctic *Joppidium* in which the female abdomen has its basal half blackish and apical half brown.

Specimens (26♂, 29♀): From District of Columbia (Washington); Georgia (Stone Mountain); Kansas (Onaga); Kentucky; Maryland (Chevy Chase Lake); Mississippi (4 miles south of Onward); Missouri (Springfield, Van Buren in Ozark Mts., and Willard); North Carolina (Asheville and valley of Black Mts.); Ohio (Cincinnati, Franklin Co., and Lancaster); Pennsylvania (Mechanicsburg); South Carolina (Greenville and Venus in Greenville Co.); Texas (College Station); and Virginia (Barcroft, Chain Bridge near McLean, Falls Church and East Falls Church, Glencarlyn, and Vienna).

Dates of collection are from late spring to early fall. The earliest and latest dates are: April 22 at College Station, Tex.; May 11 at

Glencarlyn, Va.; May 24 at Stone Mountain, Ga.; September 21 at Falls Church, Va.; September 26 at Willard, Mo.; October 3 at Washington, D.C.; and October 4 at Venus, Greenville Co., S.C.

This species is widely distributed in the Carolinian fauna and there are several Austroriparian records for it.

8. Joppidium dubiosum Cresson

Joppidium dubiosum Cresson, 1873, Proc. Acad. Nat. Sci. Philadelphia, vol. 1873, p. 138; ♂, ♀. Lectotype: ♀, Cordova, Mexico (Philadelphia).

Opisosextus (!) *ruficeps* Szépligeti, 1916, Ann. Mus. Nat. Hungarici, vol. 14, p. 240; ♂. Name preoccupied in *Joppidium* by Walsh, 1873. New synonymy. Type: ♂, Mexico (Budapest).

Front wing 8.5 to 12.0 mm. long; mesopleurum and metapleurum of male with fine, weak punctures that are separated by about 2.5 their diameter, entirely smooth except for restricted areas of indistinct irregular wrinkling on mesopleurum; mesopleurum of female with about half of its surface occupied by weak, irregular, longitudinal wrinkling, the rest with small, weak, irregular punctures that are separated by about 1.5 their diameter; metapleurum of female with small, rather weak punctures that are separated by about 2.0 their diameter; basal carina of propodeum absent to subcomplete (even when complete it is blunt and indistinct), averaging more complete in female than in male; propodeum smooth except for minute, weak, distant punctures, with coarse transverse wrinkles on its apical 0.3± in male, on its apical 0.55± in female.

Black, with black wings. Head, mouth parts, and scape ferruginous, with a variable amount of fuscous on occiput, vertex, and median part of frons, the fuscous areas averaging larger and darker in males; pedicel ferruginous, in male brown above; flagellum of male dark brown, with a yellowish white band occupying about 13 segments; flagellum of female yellow, fulvous basally, its apical 0.4 black; thorax with ferruginous tinges anteriorly; front and middle coxae and trochanters brown, the front ones paler; front and middle femora fulvous, more or less brownish basally; all tibiae and tarsi yellow, the apex of tarsi tinged with brown; apex of hind femur tinged with yellow.

Specimens (12♂, 9♀): From Alabama (Pyriton in Clay Co.); Georgia (Atlanta, Cleveland, Kennesaw Mt., Kirkwood, Stone Mountain, and Toccoa); South Carolina (Greenville, Seneca, and Table Rock); Virginia (Petersburg); and Mexico (7 kilometers west of El Cercado in Nuevo Leon at 2,100 ft., 29 kilometers north of Saltillo in Coahuila at 4,850 ft., and "km 25 RR" from Sureste in Vera Cruz).

Dates of collections for United States specimens are from early summer to late summer, the earliest and latest dates being: May 26 at Atlanta, Ga.; June 16 at Toccoa, Ga.; October 1 at Table Rock, Greenville Co., S.C.; and October 1 and 3 at Greenville, S.C. The three Mexican collections reported above were made June 6, "August," and October 16.

This species is known from the Carolinian fauna and from Mexico.

III. MOERENS GROUP

Lower half of frons smooth, without grooves, wrinkles, or carinae; upper tooth of mandible about the same length as lower tooth; notaulus not sharp, rather short; mesopleurum with very fine close punctures, without any wrinkles or coarse punctures; basal transverse carina of propodeum complete and strong; apical transverse carina of propodeum represented by a pair of well separated tubercles; first tergite of female unusually slender, without a dorsolateral longitudinal carina, its spiracle far from apex.

This group occurs in southern South America. It includes *Cryptus dimidiatus* Taschenberg 1876, *Alomya moerens* Perty 1833, and an undescribed species from Argentina. The names *dimidiatum* and *moerens* have not previously been referred to *Joppidium* (new combinations). Synonyms of *moerens* (all new) are: *Cryptus violaceipennis* Brullé 1846, *Opisosextus* (!) *concolor* Szépligeti 1916, *O. incompletus* Szépligeti 1916, and *Isocryptus azureus* Brèthes 1927.

15. Genus Hidryta

FIGURE 315,b

Hidryta Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 187. Type: (*Brachycryptus erythrocerus* Thomson) = *frater* (Cresson); designated by Viereck, 1914.

Brachycryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 487. Type: (*Brachycryptus erythrocerus* Thomson) = *frater* (Cresson); designated by Viereck, 1914.

Euthycryptus Jussel, 1907, Beiträge zum 50 jährigen Bestande zugleich 44. Jahresbericht über das Jahr 1906, Voralberger Landesmuseum, Bregrenz, p. 71. New synonymy. Type: *Euthycryptus scrobiculifer* Jussel; monobasic.

Front wing 3.1 to 5.6 mm. long; frons unarmed; clypeus small, rather weakly convex, its apex broadly truncate or weakly arcuate, without a median tooth; thorax rather short, first abdominal segment long, and rest of abdomen short, the first abdominal segment 0.55 to 0.70 as long as thorax; mesoscutum short, rather weakly convex, polished or subpolished, its punctures moderately coarse, separated by about their diameter; notaulus sharp, reaching at least to center of mesoscutum; epomia weak or absent; prepectal carina reaching dorsad to subtegular ridge; prepectus without a short vertical carina opposite lower corner of pronotum; propodeum in profile weakly convex, strongly sloping, its basal carina complete, its apical carina complete or interrupted medially, forming weak sublateral crests; propodeal spiracle circular; areolet moderately large, pentagonal, its sides rather strongly convergent; ramellus short or absent; nervulus opposite basal vein; nervellus broken near or below the middle (rarely not broken); axillus short and weak, near anal margin or divergent from it; first tergite long, slender, gradually and weakly widened apically, its spiracle far behind the middle, postpetiole weakly convex above, basolateral tooth absent, and the ventrolateral and dorsolateral carinae strong and complete; median dorsal carinae of first tergite distinct, reaching about to center of postpetiole; second tergite mat, with very fine, rather sparse punctures; tergite 7 sometimes with a white spot; ovipositor sheath about 0.20 as long as front wing; ovipositor moderately slender, somewhat compressed, its upper valve with a distinct nodus, rather abruptly tapered beyond the nodus.

Hidryta contains two Nearctic species, one of which is Holarctic, and several additional species in Eurasia.

Key to the Nearctic species of Hidryta

1. Tergites 2 and 3 ferruginous; spiracle of tergite 2 separated from margin of tergite by about 1.5 its diameter in male, by about 3.5 its diameter in female (measure diameter of spiracle outside of its rim); tergites 6 and 7 of female entirely black; ovipositor tip about 2.3 as long from nodus to apex as it is deep at nodus; hind femur usually paler at apex than elsewhere, sometimes unicolorous . . . . **1. frater** (Cresson)

Tergites 2 and 3 largely or entirely fuscous or black; spiracle of tergite 2 separated from margin of tergite by about 0.3 its diameter in male, by about 1.0 its diameter in female; tergites 6 and 7 of female with a median white area; ovipositor tip about 4.0 as long from nodus to apex as it is deep at nodus; hind femur usually darker at apex than elsewhere, sometimes unicolorous . . . . **2. nigricoxus** (Provancher)

1. Hidryta frater (Cresson)

Cryptus frater Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 303; ♀. Type: ♀, Illinois (Philadelphia).

Brachycryptus erythrocerus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 488; ♀. New synonymy. Lectotype (hereby designated): ♀ (labeled lectotype by Townes in 1958), Ringsjön, Skåne, Sweden (Lund).

Front wing 3.2 to 5.6 mm. long; mesopleurum mostly with dense reticulate wrinkling (the result of crowding of its punctures); first tergite about 3.15 as long as wide in male, about 2.6 as long as wide in female; spiracle of second tergite separated from margin of tergite by about 1.5 its diameter in male, by about 3.5 its diameter in female; tip of ovipositor about 2.3 as long from nodus to apex as it is deep at nodus.

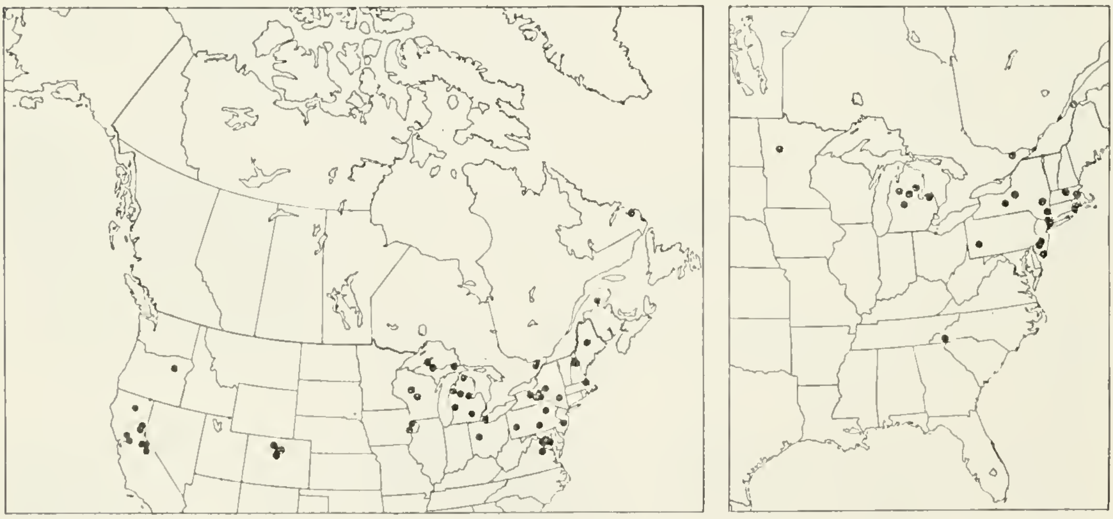
Black. Mandible dusky ferruginous apically; tegula black; front and middle femora varying from fulvous with some basal infuscation to black with the apical part fulvous; hind femur entirely black, black with its apical part fulvous, or fulvous with some basal infuscation;

front tibia fulvous; middle tibia fulvous, or fuscous with the base and apex fulvous; hind tibia varying from fulvous to black; tarsi brown to fuscous, paler at the joints; wings weakly infuscate; tergites 2–4 and more or less of apex of tergite 1 ferruginous; tergite 5 varying from ferruginous to fuscous.

Specimens from California have the dark markings unusually intense but do not seem to be separable as a subspecies.

Specimens (54♂, 24♀): From California (Davis, Galt, Hallelujah Junction in Lassen Co., Old Station, Pine Crest, 4 miles west of Quincy, Sardine Creek in Mono Co. at 8,500 ft., and Strawberry in Tuolumne Co.); Colorado (Boulder, Peaceful Valley, Poudre Canyon in Larimer Co. at 5,200 ft., and Valmont); District of Columbia (Washington); Iowa (Cedar Co. and Jackson Co.); Labrador (Cartwright); Maine (summit of Mount Katahdin at 5,215 ft.); Maryland (Patuxent Refuge near Bowie and Takoma Park); Massachusetts (Ipswich); Michigan (Ann Arbor, Benzie Co., Cheboygan Co., Gladwin Co., Huron Mts., Keweenaw Co., Luce Co., Missaukee Co., and Muskegon Co.); New Hampshire (Franconia, Glen House, and Gorham); New Jersey (Hornerstown); New York (Canadarago Lake, Geneva, Ithaca, McLean Bogs in Cortland Co., Michigan Hollow Swamp in Tompkins Co., and Poughkeepsie); Ohio (Logan Co. and Put-in-Bay); Ontario (Blackburn and Ottawa); Oregon (Anthony Lake); Pennsylvania (Highspire, Pittsburgh, and Spring Brook); Quebec (Cascapedia); Virginia (Falls Church, Fredericksburg, and Rosslyn); and Wisconsin (Stanley and Worden Twp. in Clark Co.).

Most collection dates are between May 30 and August 3. Those outside of this range are: April 12 at Davis, Calif.; April 22 at Quincy, Calif.; April 28 at Valmont, Colo.; May 20 at Spring Brook, Pa.; May 23 at Ithaca, N.Y.; May 24 in Gladwin Co., Mich.; August 15



Figures 174, 175.—Localities: 174 (left), *Hidryta frater;* 175 (right), *H. nigricoxus.*

at Ithaca, N.Y.; August 18 at Hornerstown, N.J.; August 19 at Gorham, N.H.; and August 19 to 22 in Poudre Canyon at 5,200 ft., Larimer Co., Colo.

We find the species among the coarse grasses and sedges of marshy meadows.

This species is transcontinental in the Canadian and Transition zones and occurs also in Eurasia.

2. Hidryta nigricoxus (Provancher)

Cryptus nigricoxus Provancher, 1888, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 361; ♂. Type: ♂, Cap Rouge, Que. (Quebec).

Brachycryptus niger Cushman, 1926, Proc. U.S. Nat. Mus., vol. 67, art. 23, p. 7; ♂, ♀. Type: ♀, Ohio (Washington).

Front wing 3.1 to 5.0 mm. long; mesopleurum mostly with distinct punctures; first tergite about 4.2 as long as wide in male, about 3.7 as long as wide in female; spiracle of second tergite separated from margin of tergite by about 0.3 its diameter in male, by about 1.0 its diameter in female; tip of ovipositor about 4.0 as long from nodus to apex as it is deep at nodus.

Black. Apical part of mandible stained with ferruginous; femora fulvous to brownish black, usually fulvous; if hind femur is fulvous, its apical 0.2± is infuscate; front and middle tibiae fulvous; front and middle tarsi brown, paler at the joints; hind tibia and tarsus fuscous; wings weakly infuscate; abdomen blackish, the apex of first tergite, apical 0.1 to 0.4 of second tergite, and usually apical margin to apical 0.3 of third tergite fulvous or dusky fulvous; tergites 6 and 7 of female with a median apical white spot.

Specimens (30♂, 9♀): From Massachusetts (Framingham and Warwick); Michigan (Clare Co., Huron Co., Ogemaw Co., 2 miles west of Remus, and Wexford Co.); Minnesota (Itasca Park); New Jersey (Clementon, Pemberton, and Thompsons Beach near Heislerville); New York (Beaver Creek on McLean Reservation, Greene Co., Peekskill, Poughkeepsie, Rome, and Yonkers); North Carolina (Highlands at 3,800 ft.); Nova Scotia (Hunter Creek near Baddeck); Ontario (Dow's Swamp near Ottawa); Pennsylvania (Pittsburgh); Quebec (Parke Reserve in Kamouraska Co. at 950 ft.); and Rhode Island (Kingston and Westerly).

Most collection dates are in June and July. Those outside of this range are: May 24 at Clementon, N.J.; May 30 in Huron Co., Mich.; August 3 at Rome, N.Y.; August 11 in Ogemaw Co., Mich.; and August 24 and 26 in Parke Reserve, Kamouraska Co., Que.

This species occurs in the Alleghanian fauna.

16. Genus Idiolispa

Figure 316,a

Idiolispa Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 188. Type: *Bassus analis* Gravenhorst; included by Brischke, 1881.

Liocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 489. Type: *Bassus analis* Gravenhorst; monobasic.

Paracryptus Szépligeti, 1916, Ann. Mus. Nat. Hungarici, vol. 14, p. 251. Type: *Paracryptus hungaricus* Szépligeti; monobasic.

Front wing 3.6 to 8.5 mm. long; frons unarmed; clypeus large, convex, its apical margin broadly convexly arcuate, without a median tooth; thorax stout and short, first abdominal segment long, and rest of abdomen short, the first abdominal segment 0.50 to 0.58 as long as thorax; mesoscutum short, weakly convex, polished or subpolished, its punctures moderately coarse and separated by about their diameter; notaulus weak or absent, not reaching center of mesoscutum; epomia absent or weak; prepectal carina reaching dorsad to subtegular ridge; prepectus without a short vertical carina opposite lower corner of pronotum; propodeum in profile rather weakly convex, sloping, its basal carina strong and complete, its apical carina strong, forming weak to moderately strong, broad, sublateral crests, medially often weak, or sometimes absent; propodeal spiracle elliptic; areolet large, quadrate, its sides subparallel; ramellus short or absent; nervulus opposite or a little basad of basal vein; mediella moderately arched; nervellus broken near its lower 0.3; axillus short, either convergent to or divergent from anal margin; first tergite moderately long and slender, rather gradually and moderately widened apically, its spiracle rather far behind the middle, postpetiole moderately convex above, without a basal lateral tooth, ventrolateral carina sharp and complete, dorsolateral carina complete but blunt, and median dorsal carinae absent or short and weak; second tergite polished or subpolished, its punctures moderately dense to very sparse, varying from very fine and weak to moderately small but strong; tergite 7 with or without a median white mark; ovipositor sheath about 0.24 as long as front wing; ovipositor rather slender, gradually tapered to the apex, without a distinct nodus.

Idiolispa is a small genus, of Holarctic distribution. *Hidryta* is a close relative and it may be that species intermediate to *Hidryta* will be discovered, which will make it necessary to merge the two genera.

The species occur mostly in overgrown fields, edges of woods, or in open woods, not in open meadows nor usually in dense woods.

Keys to the Nearctic species of Idiolispa

MALES

1. Punctures on postpetiole separated by about 2 times their diameter; punctures on tergites 2 and 3 often rather strong (but small); first segment of flagellum about 2.2 as long as wide; tergite 7 often with a median apical white spot. **1. albisoleata** (Walsh)

Punctures on postpetiole separated by about 5 times their diameter; punctures on tergites 2 and 3 very weak, hardly at all impressed; first segment of flagellum about 3.0 as long as wide; tergite 7 without a white spot . . . 2

2. Clypeus in profile rather evenly convex, its highest point at the middle; temple at midheight of eye weakly convex, about 0.75 as long as eye; apical 0 to 0.5 of hind basitarsus white; sublateral portions of apical carina of propodeum less strongly sloped, so that if projected to midline they would meet at about 120° . . . . **2. analis** (Gravenhorst)

Clypeus in profile more strongly convex subapically than subbasally, its highest point a little below the middle; temple at midheight of eye approximately flat, about 0.60 as long as eye; apical 0.5 to 0.7 of hind basitarsus white; sublateral portions of apical propodeal carina more strongly sloped, so that if projected to midline they would meet at about 100°. **3. aestivalis,** new species

FEMALES

1. Third tergite with moderately dense setiferous punctures all over; first segment of flagellum about 1.9 as long as wide; tergites 6 and 7 often with a median apical white mark . . . . **1. albisoleata** (Walsh)

Third tergite almost entirely impunctate and hairless except on its lateral 0.25±, where it has very fine weak punctures; first segment of flagellum about 3.0 as long as wide; tergites 6 and 7 not marked with white . . . 2

2. Clypeus in profile rather evenly convex, its highest point at the middle; temple at midheight of eye distinctly convex, about 0.75 as long as eye; sublateral portions of apical carina of propodeum close to horizontal, so that if projected to midline they would meet at about 150° . . . . . **2. analis** (Gravenhorst)

Clypeus in profile much more strongly convex subapically than subbasally, its highest point a little below the middle; temple at midheight of eye approximately flat, about 0.60 as long as eye; sublateral portions of apical carina of propodeum strongly sloping, so that if projected to midline they would meet at about 125° . . . . **3. aestivalis,** new species

1. Idiolispa albisoleata (Walsh), new combination

Cryptus? albisoleatus Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 80; ♂. Type: ♂, Illinois? (destroyed in Chicago fire of 1871).

Front wing 3.6 to 7.2 mm. long; clypeus elliptic, rather small, very evenly convex; cheek about 1.25 as long as basal width of mandible; temple at midheight of eye rather strongly convex; first segment of flagellum about 2.2 as long as wide in male, about 1.9 as long as wide in female; mesopleurum polished, with rather coarse strong punctures that vary from rather sparse to rather dense, usually also

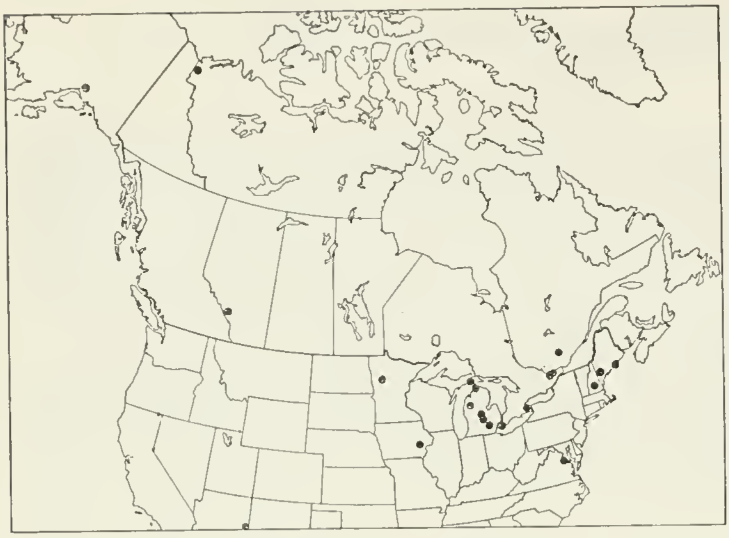


FIGURE 176.—Localities for *Idiolispa albisoleata.*

with some more or less distinct horizontal wrinkles; legs unusually short and stout; nervulus opposite the basal vein or approximately so; apical carina of propodeum sublaterally forming very weak crests, almost horizontal at the crests, just mesad of them swinging strongly forward, in the female usually obsolete or absent near the midline; first tergite about 2.3 as long as wide in male, about 1.8 as long as wide in female; punctures on postpetiole of male of moderate size, separated by about 2 times their diameter; tergite 3 of male with weak, small or moderately small punctures that are separated by about 1.2 their diameter; tergite 3 of female with fine to coarse punctures that are dense when coarse, sparser when small, but in all cases separated by 0.5 to 1.0 the length of the hairs.

Male: Black. Front coxa black or more or less brown or fulvous brown; front and middle second trochanters blackish to fulvous with fuscous tinges; front and middle femora varying from fuscous with some fulvous at apex to fulvous with a little infuscation basally; front and middle tibiae fulvous, their tarsi light brownish with the fifth segment fuscous, sometimes the tarsi whitish except at base and apex; hind second trochanter and femur entirely blackish to fulvous with some infuscation, particularly on apex of femur; hind tibia and tarsus fuscous or brown, the tarsal segments 2–4 and sometimes apex of segment 1, white; hind tarsal segment 2 sometimes partly fuscous; wings faintly infuscate; abdomen ferruginous, its first segment infuscate basally, its tergites 5–8 (and rarely part of 4) often more or less infuscate; tergite 7 usually and tergite 6 often with a median apical white spot.

Female: Black. Clypeus and part of mandible often dark ferruginous; face and cheek sometimes stained with ferruginous; antenna brown to black, palest basally, usually with a median incomplete white band that covers about 4 segments; tegula sometimes light brown; front and middle legs blackish brown to ferruginous or brownish fulvous, their first trochanters often darker than the rest; hind coxa and trochanters blackish to fulvous, usually blackish; hind femur blackish to fulvous, usually fulvous; hind tibia and tarsus fuscous to brownish fulvous; wings weakly infuscate; abdomen ferruginous or fulvoferruginous, its first segment infuscate basally, its tergites 4–8 usually fuscous, the median part of apical margin of tergites 6 and 7 usually white, and sometimes tergite 5 with a small median apical white mark.

This species, as defined, is extraordinarily variable in both structure and color. It seems likely that we have here a mixed series that will ultimately be shown to comprise about six discrete species, plus some subspecies. This is unprovable, however, on the basis of specimens available now, so we have included all of the complex under a single specific name. The most impressive differences are in size, shape of clypeus, width of temple, punctation and wrinkling of mesopleurum, course and strength of apical carina of propodeum, strength and density of punctures on the tergites, and coloration of legs and apical tergites. Some of these differences correlate with size and geographic distribution.

Since the type is destroyed, identification of Walsh's "*Cryptus albisoleatus*" rests on the original description. Features in the description which point particularly to the present species are the short stout antenna, color of legs, stout first tergite, and white spot on tergite 7. We have seen no other species with this combination of characters.

Specimens (17♂, 12♀): From Alaska (Matanuska); Alberta (Lake Louise); Arizona (near Alpine); "Greys Mills"; Iowa (Muscatine Co.); Maine (Paris and Southwest Harbor); Michigan (Ann Arbor, Douglas Lake, Gratiot Co., Midland Co., Naubinway, and Wexford Co.); Minnesota (Itasca Park); New Hampshire (Franklin); Northwest Territories (Aklavik); Ontario (Bells Corners, Jockvale in Carleton Co., Jordan, and Leamington); Quebec (Nominingue); and Virginia (Falls Church).

Most collection dates are from June 3 to July 8. Those outside of this range are: May 22 in Midland Co., Mich.; May 27 at Leamington, Ont.; May 28 near Alpine, Ariz.; May 30 in Wexford Co., Mich.; July 13 at Franklin, N.H.; and July 17 at Lake Louise, Alta.

Reared specimens are as follows: 2♀, from Megachilidae in decayed log, Aklavik, N.W.T., June 26 and 30, 1956, R. E. Leech. This host record needs confirmation, as related species have spider eggs as hosts.

This species is transcontinental in the Canadian and Transition zones.

2. Idiolispa analis (Gravenhorst)

Front wing 4.7 to 8.5 mm. long; segment 1 of male flagellum about 3.0 as long as wide; clypeus broadly elliptic, evenly convex, the convexity varying from weak to strong, the highest point of convexity at middle of clypeus; temple at midheight of eye distinctly convex, about 0.75 as long as eye; cheek about 0.75 as long as basal width of mandible in male, about 1.0 as long in female; mesopleurum polished, with small, sharp, rather dense punctures and a variable amount of wrinkling which may partially obscure the punctures; nervulus usually in front of basal vein by about 0.2 its length, sometimes opposite basal vein; apical carina of propodeum very strong sublaterally, where it is rather weakly sloped, especially in female, or in female often horizontal; first tergite about 2.75 as long as wide in male, about 2.50 as long as wide in female; punctures on first tergite of male very small, separated by about 5 times their diameter; tergite 3 of male polished or weakly mat, with fine, weak punctures that are separated by about 0.75 the length of the hairs; tergite 3 of female polished, almost impunctate, with scattered fine, weak punctures that are separated by about 4 times the length of their hairs, near lateral edge the punctures (and hairs) denser.

Coloration variable, according to the subspecies.

Idiolispa analis is Holarctic. It is adult in spring and early summer. We know of four subspecies, and there are probably additional ones in Asia. *Idiolispa analis* var. *suigensis*, described by Uchida from Korea in 1930, is not a form of this species but belongs to *Trychosis*. *Trychosis suigensis* is a new combination. The subspecies at hand are differentiated as follows:

1. Tergites 2 and 3 black or blackish; range: Sachalin and Japan. **2d. analis nigra** Uchida
   Tergites 2 and 3 ferruginous 2
2. Tergites 6 and 7 largely or entirely infuscate or black; range: Europe and parts of northern North America . . . . . . **2a. analis analis** (Gravenhorst)
   Tergites 6 and 7 ferruginous 3
3. Hind basitarsus of male with its apical 0.3 or more white; flagellum of female nearly always with a median dorsal white stripe that covers two or more segments; wings weakly infuscate; hind femur always black; range: Alleghanian and Carolinian faunas . . . . **2b. analis limata** (Cresson)
   Hind basitarsus of male entirely fuscous; flagellum of female without a median dorsal white stripe, or with one that covers only one or two segments; wings rather strongly infuscate; hind femur ferruginous or black. **2c. analis ignea,** new subspecies

2a. Idiolispa analis analis (Gravenhorst)

Bassus analis Gravenhorst, 1807, Vergleichende Uebersicht des Linnéischen und einiger neuern zoologischen Systeme . . ., p. 266. No sex or locality given. Lectotype (hereby designated): ♀ (labeled lectotype by Townes in 1958), no data on specimen, but from somewhere in central Europe (Wroclaw).

Ischnus lentus Provancher, 1875, Naturaliste Canadien, vol. 7, p. 110; ♂, ♀. New synonymy. Lectotype: ♂, Quebec (Quebec).

Black. Flagellum of female with a median incomplete white band that occupies 2–5 segments; front femur entirely and middle femur partly brownish fulvous in front and apically; front and middle tibiae fulvous brown, their tarsi medium brown, darker apically; hind basitarsus of male fuscous, its apical 0.5 or less white; segments 2–4 of hind tarsus of male entirely white or the second segment more or less fuscous; wings weakly infuscate; abdomen ferruginous, the basal 0.5± of first segment infuscate and tergites 5 or 6 through 8 infuscate or black.

In the Gravenhorst collection in Wroclaw there are 13♂, 8♀ standing under the label "*Cryptus analis.*" Of these 11♂ are *Pycnocryptus director*, 2♂ are a species of *Trychosis* that is colored like *P. director*, 3♀ are *Trychosis* spp., and 5♀ are the form treated here as *Idiolispa analis analis*. The arrangement in the collection agrees with Gravenhorst's latest treatment of the species (1829, Ichneumonologia europeae, vol. 2, p. 560), which, as noted above, is based on a mixed series. His original description (1807) seems to fit the male of *Pycnocryptus director* better than any of the other species involved in 1829, especially since he describes the first abdominal segment as black with the apical margin fulvous, and does not mention a white mark on the flagellum. It is not possible to be sure, however, that in 1807 he did not have *Idiolispa analis analis*, and since the name is traditionally applied to this form and since the application is not clearly wrong, we accept the precedent and have labeled one of Gravenhorst's females of the present form as lectotype.

Specimens (58♂, 30♀): From Alberta (Banff); British Columbia (Carbonate on Columbia River at 2,600 ft. and Robson); Labrador (Goose Bay); Maine ("Carrs"); Manitoba (Aweme, Cedar Lake, and Gillam); Massachusetts (Ellis); Michigan (Isle Royale in Keweenaw

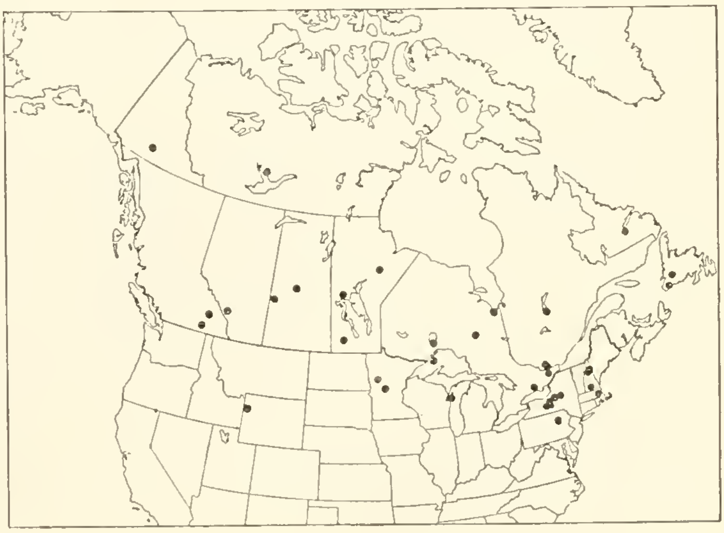


FIGURE 177.—Localities for *Idiolispa analis analis.*

Co.); Minnesota (Cushing and Itasca Park); Newfoundland (Harmon Field and Little River-Codroy); New Hampshire (Glen House, Jaffrey, and Mount Washington at 2,500 ft.); New York (Caroline, Danby, Ithaca, McLean Bogs in Tompkins Co., and Waterville); Northwest Territories (Yellow Knife); Ontario (Macdiarmid on Lake Nipigon, Moose Factory, Smoky Falls on Mattagami River, Stittsville, and Trenton); Pennsylvania (Spring Brook); Quebec (Kingsmere, Meach Lake, and Mistassini Post); Saskatchewan (Cut Knife on Attons Lake and Waskesiu [Lake]); Wisconsin (Door Co.); Wyoming (Jenny Lake in Grand Tetons); Yukon Territory (Whitehorse); Austria; Germany; Hungary; Italy; and Switzerland.

Dates of collection on the American specimens are from mid-spring to mid-summer. The earliest and latest dates are: May 11 at Ellis, Mass.; May 14 at Spring Brook, Pa.; May 19 at Caroline, N.Y.; May 22 at Aweme, Man.; July 11 and August 11 on Isle Royale, Mich.; and July 13 at Gillam, Man. European specimens also show an early season distribution.

This subspecies is transcontinental in the Canadian zone and occurs also in Europe.

2b. Idiolispa analis limata (Cresson)

Cryptus limatus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 298; ♀. Type: ♀, Delaware (Philadelphia).

Similar to the subspecies *I. analis analis* except that tergites 5–7 are always ferruginous. In the male the apical 0.3 to 0.5 of hind basitarsus is white, and segment 2 of hind tarsus is always entirely white. Tergite 8 varies from ferruginous to dusky. In color it is also like *Idiolispa aestivalis* except that the male has a little more black on the hind basitarsus.

Specimens (32♂, 45♀): From British Columbia (Robson); Colorado (Pando); Connecticut (Lyme); Kansas (Baldwin); Maine (Brewer and Mount Katahdin); Maryland (Takoma Park); Massachusetts (Am-

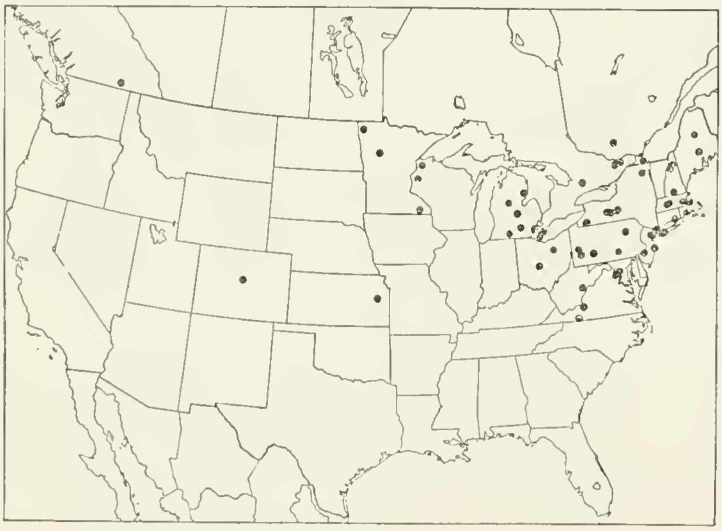


FIGURE 178.—Localities for *Idiolispa analis limata*.

herst, Hatch Experiment Station near Amherst, Humarock, and Wellesley); Michigan (Ann Arbor, Branch Co., Clare Co., Grosse Ile, Iosco Co., and Shiawasee Co.); Minnesota (Houston Co., Itasca Park, and Kittson Co.); Newfoundland (Codroy Valley); New Hampshire (Franconia, Jaffrey, and Mount Washington); New Jersey (Paterson, Riverton, and Seaside Park); New York (Hempstead Plains on Long Island, Ithaca, McLean, Rock City in Cattaraugus Co., Taughannock near Ithaca, West Farms in New York City, Whiteface Mt., and Wyandanch on Long Island); Ohio (Akron, Columbus, and Put-in-Bay); Ontario (Carp, Merivale, Miners Bay, and Point Pelee); Pennsylvania (Allegheny, Jeannette, New Cumberland, South Heights, and Spring Brook); Quebec (Covey Hill and Kazabazua); Virginia (Craig Co., Falls Church, and Meadows of Dan); West Virginia (Cheat Mt. in Randolph Co.); and Wisconsin (west of Amery in Polk Co., and east of Gordon).

Dates of collection are from rather early spring to early summer. The earliest and latest dates are: April 2 at Riverton, N.J.; April 19 at Falls Church, Va.; April 20 at Paterson, N.J.; July 2 at Humarock, Mass.; July 5 at Columbus, Ohio; July 14 at summit of Whiteface Mt., N.Y.; and "July–August" in the Codroy Valley, Newfoundland.

This subspecies occurs mostly in the Alleghanian and Carolinian faunas.

2c. Idiolispa analis ignea, new subspecies

This subspecies has the face and clypeus a little wider, temple a little fuller, and flagellar segments a little shorter, on the average, than in the other subspecies.

Black. Flagellum of female sometimes with a median white mark above that covers one or two segments; legs except tarsi colored sometimes as in *I. analis analis* and *I. analis limata*, but usually their femora and tibiae ferruginous; front and middle tarsi brownish ferruginous; hind tarsus of male fuscous, segments 3, 4, and often part of segment 2, white or whitish; hind tarsus of female ferruginous brown; wings infuscate; abdomen ferruginous, its first segment more or less infuscate basally.

Specimens with blackish femora and tibiae occur together with specimens with these parts ferruginous, in most of the areas represented by the material at hand. We have a few specimens with the femora and tibiae intermediate (fuscoferruginous).

Type: ♀, on flowers of *Daucus carota*, Corvallis, Oreg., Aug. 17, 1922, H. A. Scullen (Washington, USNM 63802).

Paratypes (41♂, 56♀): From Alberta (Banff); Arizona (near Alpine); British Columbia (Clinton, Creston, Okanagan, Robson, Skihist Camp on Fraser River, Victoria, and Wellington); California (Antioch, Arroyo Seco in Monterey Co., Ash Mt. River in Sequoia

National Park, Berkeley, Borrego in San Diego Co., Carmel, Cedar Pass in Modoc Co., Claremont, Folsom, Fort Tejon, Green Valley in Solano Co., Hastings Natural History Reservation in Santa Lucia Mts. at Jamesburg in Monterey Co. at 1,900 to 2,700 ft., Inverness, Keen Camp in San Jacinto Mts., Lagunitas, Leevining, Leona Heights near Berkeley Hills, Mill Valley, Mount Diablo in Contra Costa Co., Northfork, Oakland, Putah Canyon in Yolo Co., San Francisco, Santa Cruz Island, Santa Monica, Tanbark Flat in Los Angeles Co., Taylor State Park in Marin Co., Wood Lake in Tulare Co., and Yorkville); Idaho (Paradise Ridge near Moscow at 3,000 ft.); New Mexico (Cloudcroft); Oregon (Corvallis, Grants Pass, and 12 miles north of Scio); Saskatchewan (Pickthall); Utah (Coldwater Canyon near Ogden, Navajo [Lake] at 9,000 ft., and Zion National Park); Washington (Coupeville and Wawawai); and Wyoming (Jenny Lake in Grand Teton National Park).

Dates of collection are from rather early spring to early summer, or occasionally later. Most are from April to June. Those outside of this range are: March 7 in Green Valley, Solano Co., Calif.; March 10, 13, and 20 at Berkeley, Calif.; March 22 at Wood Lake, Tulare Co., Calif.; March 30 at San Francisco, Calif.; July 28 at Robson, B.C.; August 4 at Pickthall, Sask.; August 17 and November 24 at Corvallis, Oreg.; and October 27 at Ash Mountain River, Sequoia National Park, Calif. These very late records probably represent a partial late season emergence.

This subspecies ranges from southern Saskatchewan and Alberta to southern New Mexico and California.

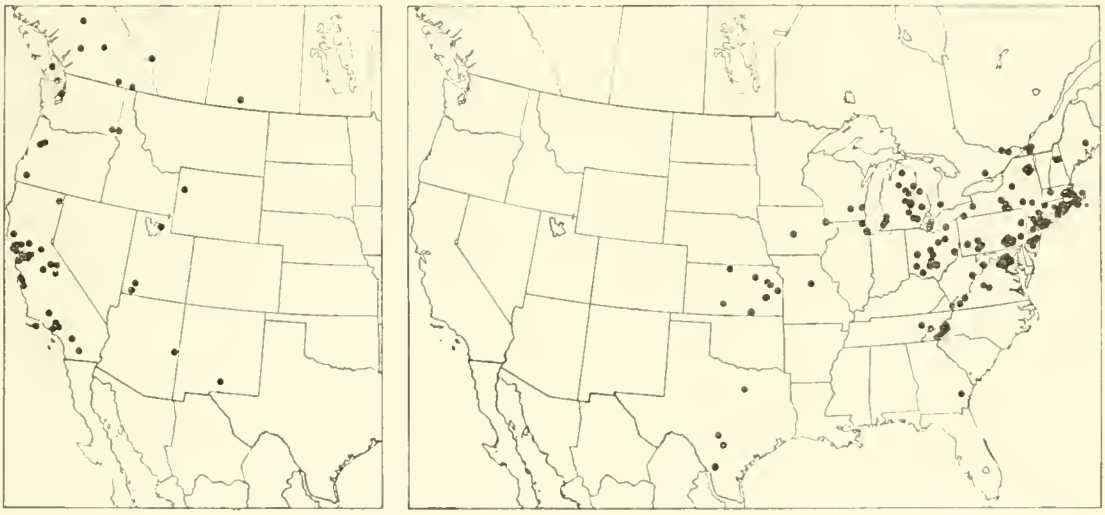
2d. Idiolispa analis nigra Uchida, new status

Idiolispa obfuscator var. *nigra* Uchida, 1930, Journ. Fac. Agr. Hokkaido Univ., vol. 25, p. 309; ♂, ♀. Types: ♂, ♀, Sachalin and Hokkaido (Sapporo).

The postpetiole is a little narrower than in the other subspecies, hairs on apical half of tergite 4 of female a little denser, and sublateral portions of apical carina of propodeum a little more transverse, in the female almost exactly horizontal.

Black. Flagellum of female with a median white dorsal stripe that covers about 5 segments; front femur and tibia largely brownish fulvous; middle femur and tibia usually more or less marked or suffused with brownish fulvous; segments 2–4 of front and middle tarsi of male white, the second segments usually fuscous basally; segments 2–4 and often tip of segment 1 of hind tarsus of male white; wings weakly infuscate; tergites 2–4 of females often with a faint ferruginous tinge.

Specimens: 16♂, 10♀, from Japan (Ikeda, Jozankei, Kamikochi, Sapporo, and Yokahama).



FIGURES 179, 180.—Localities: 179 (left), *Idiolispa analis ignea;* 180 (right), *I. aestivalis.*

3. Idiolispa aestivalis, new species

Front wing 3.6 to 8.3 mm. long; clypeus elliptic, a little more strongly convex below the middle than above, especially in females, its highest point at about its lower 0.4; temple at midheight of eye approximately flat, about 0.60 as long as eye; sublateral portions of apical carina of propodeum rather strongly sloped, especially in male. Structure otherwise as in *I. analis*, except that it averages a little more slender.

Coloration similar to that of *I. analis analis* except that abdomen is not at all infuscate apically, segment 2 of male hind tarsus is always entirely white, and segment 1 of male hind tarsus has its apical 0.5 to 0.7 white. It is even more similar in color to *I. analis limata*, differing in having a little less white on segment 1 of male hind tarsus.

Type: ♀, Ann Arbor, Mich., July 24, 1958, H. and M. Townes (Washington, USNM 63803).

Paratypes (517♂, 150♀): From Connecticut (Green Falls, Ledyard, Lyme, Norfolk, North Stonington, South Meriden, and Sterling); District of Columbia (Washington); Georgia (Jessup); Illinois (Chicago and McHenry); Iowa (Ames and Dubuque Co.); Kansas (Anderson Co., Baldwin, Kinsley, Lawrence, Sumner Co. at 1,189 ft., Miami Co., Phillipsburg, and Riley Co.); Maine (Orono); Maryland (Beltsville, Cabin John, Glen Echo, Laurel, Plummers Island, and Takoma Park); Massachusetts (Amherst, Chilmark, Duxbury, Forest Hills, Holliston, Horseneck Beach near Westport [Point], Lexington, North Saugus, Ocean Beach near Beach Bluff, Provincetown, Wollaston, and Woods Hole); Michigan (Ann Arbor, Arenac Co., Dexter, East Lansing, Gladwin Co., Gratiot Co., Lake Orion, Midland Co., Missaukee Co., Otsego Co., Owosso, Paw Paw Lake, Saginaw Co., Sand Point in Huron Co., Stevensville, and Van Buren Co.); Missouri (Columbia); New Hampshire (summit of Mount Washington and

Pinkham Notch); New Jersey (Chesilhurst, Lakehurst, Lincoln Park, Medford, Midvale, Moorestown, Ramsey, Ridgewood, and Somerville); New York (Babylon, Cold Spring Harbor, Farmingdale, Fire Island, Fishers Island, Flatbush, Great Kills, Greene Co., Greenport, Hamburg, Ithaca, Long Beach, Lott Wood near Flatbush, Massapequa on Long Island, top of Mount McIntyre in Essex Co., top of Mount Marcy, New Rochelle, Nyack, Oneonta, Orient, Oswego, Poughkeepsie, Rockaway Beach, Slide Mt. in Ulster Co., Spencer Lake, Taughannock Falls, summit of Whiteface Mt., and White Lake); North Carolina ("Blue Mts.," Black Mountain, valley of Black Mt., Crabtree Meadows in Yancey Co. at 3,600 ft., Highlands at 3,800 ft., Mount Mitchell at 6,400 ft., base of Mount Pisgah, and Whiteside Mt. near Highlands); Ohio (Barberton, Brown Co., Clifton, Columbus, Delaware Co., Hocking Co., Jug Run near Smithfield, Logan Co., Pickaway Co., Puritas Springs in Cuyahoga Co., Put-in-Bay, Ross Co., and Wooster); Ontario (Leamington, Marmora, Ottawa, and Strathroy); Pennsylvania (Crisp in Westmoreland Co., Enola, Harrisburg, Heckton Mills in Dauphin Co., Highspire, Laurel Hill in Somerset Co., North East, Pittsburgh, Pottstown, Shiremanstown, Spring Brook, Stoverdale, and West Fairview); Quebec (Hemmingford, Norway Bay, and St. Hilaire); Rhode Island (Charlestown and Westerly); Tennessee (AEC area near Oak Ridge and Headquarters of Great Smoky Mountains National Park); Texas (Dallas, Kerrville, San Antonio, and Webb Co.); Virginia (Arlington, Burkes Garden at 3,300 ft., Chain Bridge, Charlottesville, Dixie Landing, Dyke, Falls Church, Glencarlyn, Great Falls, Mountain Lake, Newington, and Tazewell); West Virginia (Cheat Mt. in Randolph Co. at 2,000 ft., and Lost River State Park in Hardy Co.); Wisconsin (Madison and Milwaukee); and Mexico (Nuevo Leon).

Collection dates are mostly from late spring to late summer. Abundance is at a peak in mid-summer. In most Carolinian localities, spring emergence is underway about May 25. Collection records earlier than May 25 and later than August are: April 1 at Jessup, Ga.; April 2 at Dallas, Tex.; April 4, 5, 6, and 16 at Kerrville, Tex.; April 16 and May 24 at Takoma Park, Md.; May 14 at San Antonio, Tex., and at Dyke, Va.; May 17 at Greenport, N.Y., and at Somerville, N.J.; May 17 and 18 at Falls Church, Va.; May 20 at Spring Brook, Pa.; May 21 and 23 at Chain Bridge, Va.; May 23 at Lawrence, Kans.; September 1 at Ann Arbor, Mich.; September 2 at North Stonington, Conn.; September 4 at Sand Point, Huron Co., Mich.; September 19 at Black Mt., N.C.; and October 19 at Falls Church, Va.

This species occurs mostly in the Alleghanian and Carolinian faunas.

17. Genus Trychosis

Figure 316,b

Trychosis Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 187. Type: *Cryptus titillator* Gravenhorst; designated by Schmiedeknecht, 1890.

Phaedrophadnus Cameron, 1906, Journ. Bombay Nat. Hist. Soc., vol. 17, p. 285. Type: *Phaedrophadnus striatus* Cameron; monobasic.

Ethaemorpha Viereck, 1913, Proc. U.S. Nat. Mus., vol. 44, p. 565. Type: *Cryptus similis* Cresson; original designation.

Orthocryptus Viereck, 1913, Proc. U.S. Nat. Mus., vol. 44, p. 567. Type: (*Cryptus monticola* Ashmead) = *sanderi* (Dalla Torre); original designation.

Front wing 3.2 to 8.8 mm. long; frons unarmed; clypeus of moderate size to small, moderately to strongly convex, its apical margin subtruncate to strongly convex, without a median tooth; thorax stout, short or moderately short, first abdominal segment long, and rest of abdomen rather short, the first abdominal segment 0.52 to 0.59 as long as thorax; mesoscutum rather short, weakly convex, polished or subpolished, its punctures coarse, moderately dense; notaulus usually weak or absent, but sometimes sharp, when present usually not reaching to center of mesoscutum; epomia usually strong; prepectal carina reaching dorsad to middle of hind margin of pronotum; prepectus nearly always with a short, vertical carina opposite lower corner of pronotum; propodeum in profile rather weakly convex, rather strongly sloping, its basal carina complete, its apical carina complete or interrupted medially, forming more or less distinct, broad sublateral crests; propodeal spiracle elliptic; areolet subquadrate, its sides subparallel or weakly convergent; ramellus short or absent; nervulus at or distad of basal vein; mediella moderately arched; nervellus broken near or below the middle; axillus rather short, divergent from anal margin, about equidistant between margin and submediella; second tergite polished or subpolished, its punctures fine, weak, moderately sparse to very sparse; tergite 7 without a median white spot; ovipositor sheath about 0.30 as long as front wing; ovipositor slender, compressed, its tip sagittate, with a distinct nodus.

Trychosis is Holarctic, with a few species also in the continental parts of the Oriental region. We treat 20 Nearctic species, but there are certainly more than these in our fauna. The genus appears to be a little larger in Eurasia than in North America.

This treatment of the Nearctic species must be considered preliminary. The species are difficult to distinguish because of the scarcity of taxonomic characters, the variability of the characters that do exist, and because a number of the "species" are probably not entirely discrete in nature. Probably some of them will eventually prove to be only subspecies of other Nearctic or of Eurasian forms. The available material has been gone over with care and the segregates that could be defined as natural populations are treated below. There are 112 specimens (0.56% of the total) that were left unclassified. These represent several additional species and subspecies, some individual variants of species or subspecies that we do treat, and some specimens too much broken to be useful. Further progress in the genus is dependent on larger collections and on field studies, but even with the help of these, progress will be slow and uncertain unless additional taxonomic characters can be discovered.

Correlated with the difficulty of defining the species, keys that would work perfectly for all specimens of all species could not be devised. The keys will bring out correctly all of some species and "typical" specimens of others. For the rest, a consideration of the additional characters mentioned in the descriptions, and some comparison material, will be needed.

The cocoons of *Trychosis* are similar to those of *Hidryta* and *Idiolispa,* but average a little more elongate. They are short elliptic, surprisingly small for the size of the adult, dark brown or greyish brown, rather thin but dense, and with a thin layer of paler feltlike silk on the outside. Cocoons of the species *montivaga, similis, kathrynae, semirubra, latidens,* and *cyperia* are at hand, the cocoons of all six very similar. Most of the cocoons are pinned with the adults which emerged from them without indications of hosts, but in the cases of *semirubra* and *kathrynae* there are some cocoons enclosed within the lenticular egg cocoons of drassid spiders, in both species with pin label notes that the spider egg cocoons were found under rocks. There are a few records from other kinds of hosts, but in these cases there is no evidence to show that the host recorded was the true host. Judging by the general ecology and morphology of the species, it seems reasonable to suppose that all species of *Trychosis,* as well as of the related genera *Hidryta* and *Idiolispa,* are parasitic in the egg cocoons of spiders.

Most of the species occur in grassy and weedy meadows and in openings in woods. A large portion of them are adult only in the first half of the growing season. Almost none are to be found in the fall.

Keys to the Nearctic species of Trychosis

MALES

(The male of *sanderi* is unknown. It is keyed on the characters it is presumed to have.)

1. Short carina on prepectus that is opposite or just below lower corner of pronotum much higher near middle than at ends, in profile subcrescentic; tergite 4 entirely or partly black 2

Short carina on prepectus that is opposite or just below lower corner of pronotum not high at middle, in profile linear or sublinear, or sometimes the carina absent; tergite 4 usually ferruginous, but sometimes partly or entirely black 3

2. Segments 2–4 of hind tarsus white or pale yellow; nervellus broken near its upper 0.45; first tergite in side view indistinctly and irregularly wrinkled between its spiracle and base, or sometimes the wrinkles distinct and vertical. **19. cyperia,** new species

Segments 2–4 of hind tarsus fuscous, their ends brown; nervellus broken near its upper 0.37; first tergite in side view with distinct vertical wrinkles between its spiracle and base . . . . **20. anagmus,** new species

3. Middle basitarsus entirely white and the apical 0.7 or more of hind basitarsus white; clypeus moderately convex, its apical margin subtruncate or weakly arched 4

Middle basitarsus partly or entirely fuscous, brown, or fulvous, or if sometimes entirely white (in *T. subgracilis*) then the hind basitarsus with less than its apical 0.5 white; clypeus moderately to strongly convex, its apical margin weakly to strongly arched 8

4. Hind femur blackish, or mostly infuscate, or brown 5

Hind femur ferruginous, its apex often more or less infuscate 7

5. Upper side of front and middle tibiae fulvous; tergites 6–8 and clasper black. **1a. montivaga montivaga** (Provancher)

Upper side of front and middle tibiae white; tergites 6–8 and clasper ferruginous 6

6. Temple distinctly convex; lower part of occipital carina about 0.4 as high as width of third segment of maxilla; base of hind tibia without a dorsal pale brown area . . . . **12. albicaligata** (Walsh)

Temple flat or weakly concave or convex; lower part of occipital carina about 1.0 as high as width of third segment of maxilla; base of hind tibia usually with a dorsal pale brown area . . . . **13. exulans** (Cresson)

7. Coxae fuscous or blackish, the front and middle coxae often marked with white in front . . . . **2. similis** (Cresson)

Coxae ferruginous, the front and middle coxae often marked with white in front and hind coxa often partly infuscate . . . . **4. coxalis,** new species

8. Upper edge of front and middle tibiae entirely white. **15. subgracilis** (Cresson)

Upper edge of front and middle tibiae fulvous to brown 9

9. Notaulus long, reaching center of mesoscutum; tergite 4 largely or entirely fuscous or black . . . . **6. sulcata,** new species

Notaulus short or absent, not reaching center of mesoscutum; tergite 4 usually entirely ferruginous, sometimes more or less fuscous or black in *T. semirubra* and *T. fuscata* 10

10. Temple at its upper 0.3 flat, concave, or faintly convex; occipital carina at its lower 0.3 very high, as high as the width of third segment of maxillary palpus (these two characters should be used together, with some allowance for variability) 11

Temple at its upper 0.3 weakly to moderately convex; occipital carina at its lower 0.3 usually not so high, usually not as high as the width of third segment of maxillary palpus 13

11. Tergite 6 blackish; temple at its upper 0.3 faintly convex next to occipital carina; hind femur black; wings subhyaline or weakly infuscate. **14. kathrynae,** new species

Tergite 6 ferruginous; temple at its upper 0.3 flat or weakly concave next to occipital carina; hind femur black to ferruginous; wings moderately infuscate 12

12. Vertical portion of epomia incomplete or very weak; temple at its upper 0.3 flat or faintly convex; hind femur black . **17. atrorubens,** new species

Vertical portion of epomia strong and complete, together with the dorsal part of epomia forming approximately a half circle; temple at its upper 0.3 more or less concave; hind femur ferruginous or black. **18. reflexa,** new species

13. Tergites 2 and 3 brown, their apical margins ferruginous. **10. fuscata,** new species

Tergites 2 and 3 entirely ferruginous. 14

14. Tergite 6 ferruginous, rarely more or less black 15

Tergite 6 black, rarely more or less ferruginous 16

15. Segments 2–4 of hind tarsus and segments 3–4 of maxillary palpus white. **1b. montivaga austrina,** new subspecies

Segments 2–4 of hind tarsus and segments 3–4 of maxillary palpus medium brown to fuscous . . . . **16. depilis,** new species

16. Apical 0.3 or more of first sternite bordered on each side by a longitudinal carina that projects weakly ventrad (this carina represents the lower edge of the tergite); punctures on head and body very dense. **11. albitarsis** (Cresson)

Apical 0.2 or less of first sternite bordered on each side by a ventrally projecting carina, or not at all bordered; punctures on head and thorax less dense 17

17. Punctures on cheek separated by about their diameter; clypeus moderately convex . . . . **3. nigripes,** new species

Punctures on cheek crowded, separated by much less than their diameter; clypeus strongly convex 18

18. Clypeus about 0.83 as wide as face . . . . **9. latidens,** new species

Clypeus about 0.7 as wide as face 19

19. Cheek with dense, coarse punctures but without distinct transverse wrinkles; tergites 3 and 4 more or less infuscate . . . . . **5. apicalis,** new species

Cheek with dense, coarse punctures that are partly obscured by weak horizontal wrinkling; tergites 3 and 4 entirely ferruginous 20

20. Front wing about 6.5 mm. long; notaulus moderately strong. **7. sanderi** (Dalla Torre)

Front wing 3.7 to 5.6 mm. long; notaulus rather weak. **8. semirubra** Townes

FEMALES

(*T. sanderi* is not included. It will key to couplet 18. The only specimen known lacks antennae.)

1. The short carina on prepectus that is opposite or just below lower corner of pronotum much higher near the middle than at ends so that in profile it appears subcrescentic; subapical part of lower valve of ovipositor with a finely wrinkled surface; fourth tergite entirely or mostly black . . . 2

The short carina on prepectus that is opposite or just below lower corner of pronotum of rather even height through most of its length, in profile not subcrescentic (the carina sometimes absent); subapical part of lower valve of ovipositor entirely smooth or with a short preapical wrinkled section; fourth tergite usually ferruginous but sometimes black or partly black . 3

2. Segments 2–4 of hind tarsus white or pale yellow; nervellus broken near its upper 0.45; first tergite in side view not distinctly wrinkled between spiracle and base, or less distinctly wrinkled than in *anagmus*. **19. cyperia,** new species

Segments 2–4 of hind tarsus fuscous, brown at the ends; nervellus broken near its upper 0.37; first tergite in side view with distinct vertical wrinkles between its spiracle and base . . . . **20. anagmus,** new species

3. Tergites 2 and 3 blackish, their apical margins ferruginous. **10. fuscata,** new species

Tergites 2 and 3 entirely ferruginous 4

4. Hind coxa entirely fulvous; tegula and palpi white . . **4. coxalis,** new species

Hind coxa black, if rarely ferruginous then the palpi fuscous; tegula and palpi variously colored 5

5. Tergite 4 largely or entirely fuscous or black; notaulus reaching center of mesoscutum; segment 3 of maxillary palpus white. **6. sulcata,** new species

Tergite 4 entirely ferruginous; segment 3 of maxillary palpus white, brown, or fuscous 6

6. Temple at its upper 0.3 flat, concave, or faintly convex; occipital carina at its lower 0.3 very high, usually higher than 0.5 the width of third segment of maxillary palpus (these two characters should be used together, with some allowance for variability) 7

Temple at its upper 0.3 weakly to moderately convex; occipital carina at its lower 0.3 not so high, usually less than 0.5 as high as the width of third segment of maxillary palpus 11

7. Tergite 8 fuscous; segment 2 of flagellum about 2.7 as long as wide. **14. kathrynae,** new species

Tergite 8 ferruginous; segment 2 of flagellum about 3.0 to 4.5 as long as wide 8

8. Temple at its upper 0.3 flat or weakly concave next to occipital carina; wings moderately infuscate; hind femur ferruginous to black 9

Temple at its upper 0.3 faintly convex next to occipital carina; wings subhyaline or weakly infuscate; hind femur black 10

9. Vertical portion of epomia incomplete or very weak; temple at its upper 0.3 flat or faintly convex; hind femur black . . **17. atrorubens,** new species

Vertical portion of epomia strong and complete, together with the dorsal part of epomia forming approximately a half circle; temple at its upper 0.3 more or less concave; hind femur ferruginous or black . **18. reflexa,** new species

10. Clypeus moderately convex; lower part of occipital carina a little higher than in *subgracilis;* sublateral portion of apical carina of propodeum oblique, weakly curved; segments 2–4 of hind tarsus whitish to brown. **13. exulans** (Cresson)

Clypeus very strongly convex; lower part of occipital carina a little lower than in *exulans;* sublateral portion of apical carina of propodeum almost horizontal, more mesad curving strongly forward; segments 2–4 of hind tarsus fuscous . . . . **15. subgracilis** (Cresson)

11. Apical 0.3 or more of first sternite bordered on each side by a longitudinal carina that projects ventrad (this carina represents the lower margin of the tergite); punctures on head and body very dense. **11. albitarsis** (Cresson)

Apical 0.2 or less of first sternite bordered on each side by a ventrally projecting carina, or not at all bordered; punctures on head and thorax less dense 12

12. Clypeus moderately convex; apical margin of clypeus weakly arcuate or subtruncate 13

Clypeus strongly convex; apical margin of clypeus rather strongly arcuate 17

13. Hind femur ferruginous, its apex a little infuscate . . **2. similis** (Cresson)
    Hind femur entirely or mostly black or fuscous 14
14. Hairs on temple about 0.5 as long as third segment of maxillary palpus. **12. albicaligata** (Walsh)
    Hairs on temple about 0.33 as long as third segment of maxillary palpus 15
15. Flagellum with a median white band. **1a. montivaga montivaga** (Provancher)
    Flagellum without a median white band 16
16. Apical tergites ferruginous . . . **1b. montivaga austrina,** new subspecies
    Apical tergites black . . . . **3. nigripes,** new species
17. Wings rather strongly infuscate; punctures on cheek separated by about 0.5 their diameter . . . . **16. depilis,** new species
    Wings weakly infuscate to subhyaline; punctures on cheek often crowded . 18
18. Second segment of flagellum about 2.6 as long as wide. **8. semirubra** Townes
    Second segment of flagellum about 3.6 or 3.75 as long as wide 19
19. Clypeus about 0.65 as wide as face; flagellum with a median white band; apical part of flagellum often pale brown . . . . **5. apicalis,** new species
    Clypeus about 0.8 as wide as face; flagellum without a median white band, but sometimes one or two of the median segments whitish above; apical part of flagellum always blackish . . . . **9. latidens,** new species

1. Trychosis montivaga (Provancher)

FIGURE 382

Front wing 5.0 to 8.5 mm. long; clypeus moderately wide, less convex than usual for the genus, its apical margin weakly arcuate or almost truncate, the margin sometimes with a faint median prominence; temple moderately convex; cheek rather short, with moderately small, sharp punctures that are separated by about their diameter; occipital carina strong and sharp but not raised as a lamella; second flagellar segment of male about 2.2 as long as wide, of female about 4.3 as long as wide; thorax rather short; notauli usually more or less distinct for about 0.25 the length of mesoscutum; punctures on mesopleurum separated by about 0.7 their diameter; propodeum rather short, in the female its apical carina broadly interrupted medially, the two lateral sections strong and sharp, rather gently sinuate and forming rudimentary sublateral crests; hind femur of male about 5.5 as long as deep, of female about 5.2 as long as deep; areolet usually rather wide; nervulus beyond basal vein by about 0.45 its length; nervellus broken near or below the middle; petiole with indistinct rounded dorsolateral and ventrolateral ridges, in the female almost terete, its lateral face with a tendency toward weak vertical wrinkling, especially in male; second tergite weakly mat, its hair sockets separated by about 0.8 the length of the hairs; ovipositor normal for the genus.

There are two subspecies, differentiated on color as below:

1. Apex of abdomen black (very rarely ferruginous); middle basitarsus of male white, its extreme base sometimes pale fulvous; flagellum of female with an

incomplete white band; range: transcontinental in southern Canada, in the United States ranging west to about the hundredth meridian.
1a. montivaga montivaga (Provancher)

Apex of abdomen ferruginous; middle basitarsus of male white, its basal 0.4± brownish; flagellum of female entirely blackish; range: New Mexico.
1b. montivaga austrina, new subspecies

1a. Trychosis montivaga montivaga (Provancher)

Cryptus montivagus Provancher, 1877, Naturaliste Canadien, vol. 9, p. 12; ♀. Type: ♀, Quebec (Quebec).

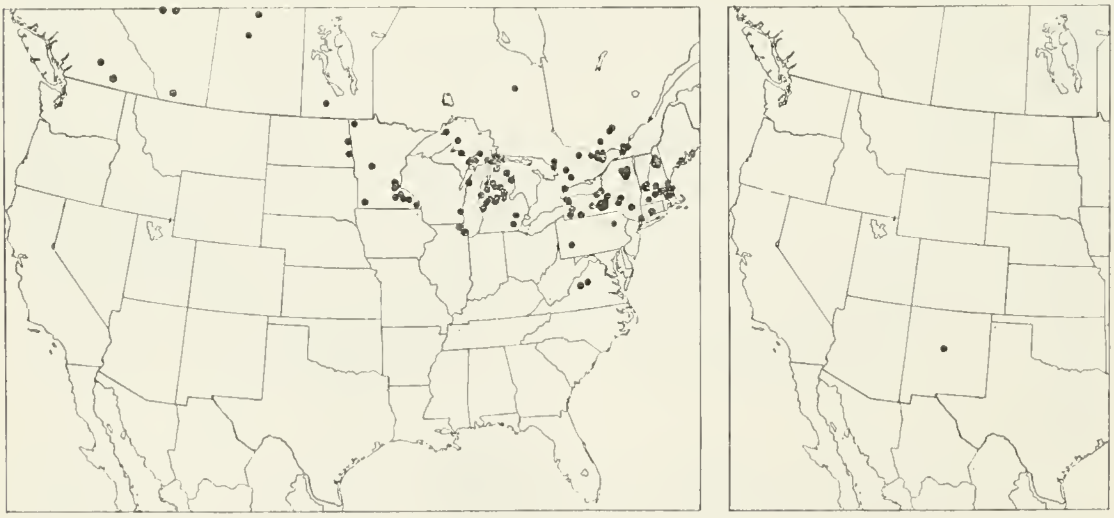
Phygadeuon fusiformis Provancher, 1886, Additions et corrections au volume II de la faune entomologique du Canada traitant des hyménoptères, p. 51; ♀. Type: ♀, Ottawa, Ont. (Ottawa).

Male: Black. Segments 3 and 4 of maxillary palpus white, the fifth segment whitish or pale brown and the second segment part white and part fuscous; apex of segment 2 of labial palpus usually white or light brown; segments 3 and 4 of labial palpus light to dark brown, rarely white; front and middle femora and tibiae fulvous, the femora infuscate ventrally; hind femur black or mostly fuscous, its base and often the apex narrowly more or less ferruginous; apical half of second hind trochanter more or less ferruginous; hind tibia dusky ferruginous or dusky fulvous, blackish apically, its extreme apex sometimes paler; front and middle tarsi whitish, their basitarsi often tinged with fulvous at base and their fifth segments light brown; hind tarsus white, the basal 0.2± of its first segment often more or less fulvous or light brown, the apical 0.6± of its fifth segment brown; wings subhyaline; abdomen ferruginous, the base of its first segment often more or less infuscate, its fifth and following segments black, the basal part of the fifth segment usually ferruginous.

Female: Black. Palpi blackish, the last three segments of maxillary palpus brown; flagellum dark brown, the basal segments medium brown below, with a white, incomplete band that covers about six segments; front femur brown, blackish below; middle femur blackish, brown above; front and middle tibiae and tarsi rather light brown; apex of hind second trochanter, narrow base of hind femur, and often narrow apex of hind femur dull ferruginous; hind tibia brown basally, shading to black apically; hind tarsus dark brown, its median three segments paler brown or more or less whitish; wings subhyaline; abdomen ferruginous, its first segment usually infuscate at base; tergites 5 and following blackish, the fifth tergite often ferruginous basally and rarely the black at apex of abdomen less extensive or absent.

Variation: Specimens from New England often have the black on apex of abdomen reduced, or rarely absent. Females from New England often have the white band on flagellum reduced. Males of Michigan, British Columbia, and the area between often have the hind femur medium brown (with or without fuscous streaks) rather than blackish.

Specimens (261♂, 97♀): From Alberta (Edmonton, Lethbridge, and Wabamun); British Columbia (Chase and Robson); Connecticut (Hamden); Illinois (Chicago and McHenry); Maine (Bar Harbor and Lincoln Co.); Manitoba (Aweme); Massachusetts (Amherst, Blue Hills Reservation, Boston, Fitchburg, Gloucester, Huntington, Newton Center, Petersham, Sherborn, and Stony Brook Reservoir); Michigan (Alcona Co., Alger Co., Ann Arbor, Brevort, Chippewa Co., Copper Harbor, Delta Co., Emmet Co., Gladwin Co., Grand Traverse Co., Isabella Co., Isle Royale, Kalkaska Co., Mackinac Co., Marquette, Mason Co., Mecosta Co., Midland Co., Missaukee Co., Montcalm Co., Muskegon Co., Naubinway, Newaygo, Oakland Co., Presque Isle Co., Roscommon Co., Rudyard, Schoolcraft Co., and Wexford Co.); Minnesota (Camp Carlos near Alexandria, Goodhue Co., Houston Co., Kittson Co., Luverne, Olmsted Co., Ramsey Co., Rice Co., St. Anthony Park, St. Paul, and Winona Co.); New Brunswick (Bathurst); New Hampshire (Glen House, Hampton, Jaffrey, Mount Lafayette, Mount Madison, Mount Washington, and Randolph); New York (Axton in Adirondack Mts., Bemus Point, Catskill Mts., Gowanda, Heart Lake in Essex Co., Ithaca, Keuka Lake, Labrador Lake in Cortland Co., McLean, McLean Bogs in Tompkins Co., top of Mount MacIntyre in Essex Co., top of Mount Marcy, North Fairhaven, Oneonta, Oswego, Otsego Lake, Ringwood near Ithaca, Rock City in Cattaraugus Co., Syracuse, Vista, and summit of Whiteface Mt.); North Dakota (Fargo and Greenwood's Slough near Grand Forks); Nova Scotia (Millsville); Ontario (Bobcaygeon, Constance Bay, Golden Lake, Jockvale, Jordan, Merivale, Miners Bay, Niagara Glen, Ottawa, Parry Sound, Smoky Falls on Mattagami River,



FIGURES 181, 182.—Localities: 181 (left), *Trychosis montivaga montivaga;* 182 (right), *T. m. austrina.*

Toronto, and Waubamick); Pennsylvania (Allegheny Co. and Spring Brook); Quebec (Aylmer, Kazabazua, Lacoste, La Trappe, Montreal, Nominingue, Queen's Park in Aylmer, and Rigaud); Saskatchewan (Waldheim and Waskesiu); Vermont (Laurel Lake near Jacksonville, Jacksonville, and South Newfane); Virginia (Big Meadows near Shenandoah Parkway and Mount Elliott in Augusta Co. at 4,473 ft.); Wisconsin (Door Co. and Milwaukee); and Yukon Territory (Watson Lake).

The great majority of collection dates are from late May to early July. The earliest and latest records are: May 16 at Oswego, N.Y.; May 17 at Hamden, Conn.; May 18 and 20 at Robson, B.C.; May 19 at Ann Arbor, Mich.; July 8 in Kalkaska Co. and Roscommon Co., Mich.; July 8 and 9 at Laurel Lake, near Jacksonville, Vt.; July 14 at summit of Whiteface Mt., N.Y., and at Aweme, Man.; and July 26 in Emmet Co., Mich.

This subspecies is transcontinental in northern United States and southern Canada.

1b. Trychosis montivaga austrina, new subspecies

Male: Black. Palpi fuscous, the third, fourth, and apex of fifth segment of maxillary palpus white; front and middle femora brown, infuscate below; front and middle tibiae pale brown; front and middle tarsi white, the basal 0.3± of front basitarsus and basal 0.4± of middle basitarsus brownish, all of their fifth segments and a dorsal apical area on the fourth segment brown; apex of hind second trochanter ferruginous; hind femur dark brown, ferruginous basally and narrowly ferruginous at apex; hind tibia brown, darkened apically, its extreme apex paler; hind tarsus white, the basal 0.3± of the first segment and all of the fifth segment brown, the fifth segment paler at base; wings subhyaline; abdomen entirely ferruginous.

Female: Black. Palpi fuscous; front femur dark brown, pale brown above and apically; middle femur dark brown, pale brown at apex; front and middle tibiae and tarsi pale brown; hind femur blackish brown, paler at base and apex; hind tibia dark brown, paler basally; hind tarsus dark brown, the segments 2–4 light brown; wings subhyaline; abdomen entirely ferruginous.

Type: ♀, Tajique, N. Mex., June 25, 1941, R. H. Beamer (Lawrence).

Paratypes: 5♂, same data as type (Lawrence and Townes). ♂, Tajique, N. Mex., June 25, 1940, R. H. Beamer (Townes).

2. Trychosis similis (Cresson)

FIGURE 383

Front wing 3.7 to 7.0 mm. long; clypeus unusually wide, strongly punctate, less convex than usual for the genus, its apical 0.4 somewhat flattened, the apical margin weakly arcuate or almost truncate (sometimes the clypeus is narrower and more convex); temple moderately convex; cheek rather short; punctures on cheek moderately coarse, separated by about 0.8 their diameter; occipital carina strong and sharp but not raised as a lamella; second flagellar segment of male about 2.4 as long as wide, of female about 4.0 as long as wide; thorax rather short; notauli distinct usually for about 0.2 the length of mesoscutum; punctures on mesopleurum very coarse, separated by about 0.4 their diameter; propodeum short, in the female its apical carina usually interrupted medially, the sublateral portions of the carina strong and sharp, rather gently sinuate, and forming rudimentary sublateral crests; areolet approximately parallel-sided; hind femur of male about 5.6 as long as deep, of female about 5.4 as long as deep; nervulus beyond basal vein by about 0.3 its length; nervellus broken near or below the middle; petiole with indistinct rounded dorsolateral and ventrolateral ridges, in cross section wider above than below, in female more rounded than in male, its lateral face with some weak rugulosity in male, almost smooth in female; second tergite subpolished, the sockets of its sublateral hairs separated by about 0.8 the length of the hairs, those of the median hairs a little more distant.

The ferruginous hind femur, slender build, and broad, rather flat clypeus distinguish this species.

There is a northern and a southern subspecies, differentiated as below. The zone of intergradation between the two subspecies is moderately wide, and intermediate individuals are frequent.

MALES

1. Tegula brown to fulvous, sometimes as much as half white; front and middle tibiae entirely fulvous, or with a narrow and usually interrupted white dorsal stripe; range: Alleghanian and Carolinian faunas.
2a. similis badiarmus, new subspecies

Tegula entirely white or more than half white; front and middle tibiae fulvous, with a broad white dorsal stripe their entire length, often with a small indistinct dorsal dark area at the basal 0.3; range: Carolinian and Austroriparian faunas . . . . **2b. similis similis** (Cresson)

FEMALES

1. Segments 2 and 3 of hind tarsus brown, not or only indistinctly paler than segment 1; range: Alleghanian and Carolinian faunas.
2a. similis badiarmus, new subspecies

Segments 2 and 3 of hind tarsus entirely or more than half white to light brown, distinctly paler in general color than most of segment 1; range: Carolinian and Austroriparian faunas . . . . **2b. similis similis** (Cresson)

2a. Trychosis similis badiarmus, new subspecies

Male: Palpi white, their basal and apical segments stramineous to fuscous, the second and third segments of labial palpus sometimes partly or entirely fuscous; tegula fulvous to brown, sometimes partly white but always less than half white; front and middle tibiae fulvous, often with a narrow white dorsal stripe, the stripe when present usually incomplete; basal 0.2± of hind basitarsus rarely infuscate; apical segments of abdomen sometimes weakly infuscate. Colored otherwise as in male of the subspecies *similis.*

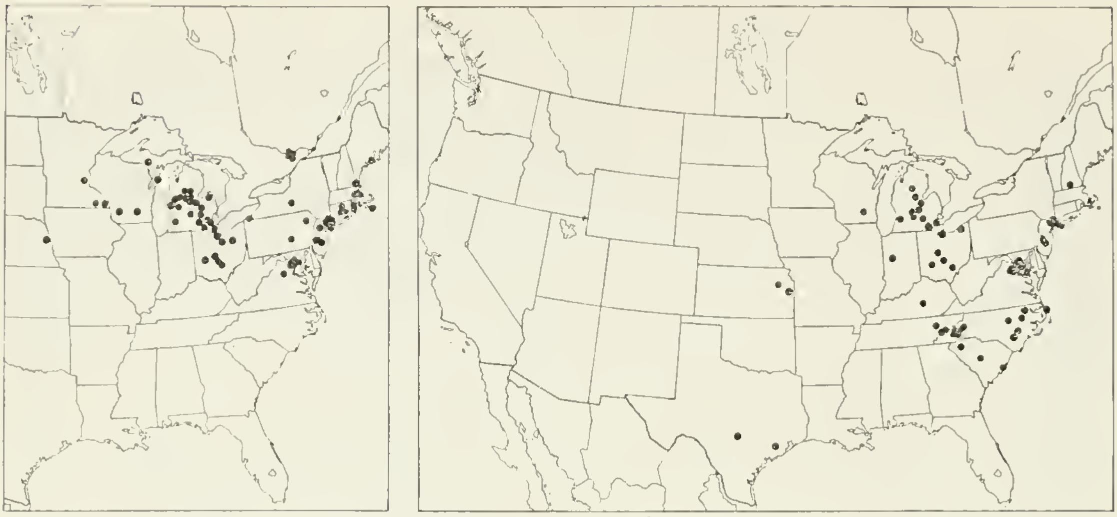
Female: Similar to female of the subspecies *similis* except that segments 2–4 of hind tarsus are brown, not distinctly paler or only a little paler than the general color of the first tarsal segment. This difference is not a sharp one. The subspecies is more easily distinguished in the male.

Type: ♂, Ithaca, N.Y., May 25, 1939, H. K. Townes (Washington, USNM 63804).

Paratypes (75♂, 53♀): From Connecticut (East Hartford, Lyme, and New Haven); Maine (Lincoln Co.); Maryland (Bowie, Patuxent Refuge near Bowie, Plummers Island, and Takoma Park); Massachusetts (Cohasset, Holliston, Milton, and Nantucket); Michigan (Ann Arbor, Clare Co., Dickinson Co., East Lansing, Genesee Co., Gladwin Co., Gratiot Co., Grosse Ile, Huron Co., Isabella Co., Kent Co., Livingston Co., Mecosta Co., Midland Co., Monroe Co., Muskegon Co., Newaygo Co., Saginaw Co., Van Buren Co., and Wayne Co.); Minnesota (Fillmore Co., Houston Co., and St. Paul); Nebraska (Fontinelle Forest in Omaha); New Hampshire (South Hampton); New Jersey (Alpine, Moorestown, and Morris Co.); New York (Cold Spring Harbor, Farmingdale, New Rochelle, Six Mile Creek in Ithaca, and Yonkers); Nova Scotia (Baddeck on Cape Breton); Ohio (Ashland Co., Barberton, Clifton, Columbus, Fairfield Co., Hocking Co., Put-in-Bay on South Bass Island, and Sandusky); Ontario (Bells Corners, Merivale, and Ottawa); Pennsylvania (Inglenook, North East, Philadelphia, and Spring Brook); Quebec (Aylmer); Rhode Island (Beach Pond and Westerly); Texas; Virginia (Falls Church and Warrenton); and Wisconsin (Boscobel, Door Co., and Madison).

Most collection dates are in June and early July but many are in the last days of May and as late as August. The earliest and latest records are: May 6 in Morris Co., N.J.; May 23 to 24, and 29 in Houston Co., Minn.; May 23 at Bowie, Md.; May 25 at Ithaca, N.Y.; May 27 at Ann Arbor, Mich.; August 7 in Gratiot Co., Mich.; August 11 in Door Co., Wis.; August 17 at Sandusky, Ohio; August 23 at Ottawa, Ont.; and August 30 in Midland Co., Mich.

This subspecies occurs in the Alleghanian and Carolinian faunas.



Figures 183, 184.—Localities: 183 (left), *Trychosis similis badiarmus;* 184 (right), *T. s. similis.*

2b. Trychosis similis similis (Cresson)

Cryptus similis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 299; ♀. Type: ♀, Delaware (Philadelphia).

Male: Black. Palpi white, their first and last segments whitish or stramineous to brown; front of scape sometimes fulvous or white; tegula white, sometimes its mesal part fulvous or brown; apex of front coxa often and apex of middle coxa sometimes white in front; front and middle first trochanters usually white in front, the rest reddish brown to blackish; front and middle second trochanters and femora fulvoferruginous; front and middle tibiae fulvous, their upper sides entirely white except for usually a small indistinct faintly darkened area near their basal 0.3; front and middle tarsi white, their fifth segments brown; hind pair of trochanters ferruginous, infuscate toward the coxa; hind femur ferruginous, its apical 0.2± usually infuscate and its dorsal edge often with faint infuscation; hind tibia blackish; hind tarsus white, the basal 0.2± of its first segment sometimes tinged with fulvous, the apical 0.2 to 0.8 of its fifth segment brown; wings subhyaline; abdomen ferruginous.

Female: Black. Palpi pale brown to brown; flagellum blackish brown, with a broad white dorsal stripe that covers about 4 segments; tegula fulvous to blackish; second trochanters brownish ferruginous; front and middle legs beyond trochanters ferruginous, their tarsi brownish apically; hind femur ferruginous, its apical 0.2± more or less infuscate dorsally, the infuscate area usually extending a lttle basad along dorsal edge; hind tibia blackish brown; hind tarsus medium brown, the segments 2 and 3 and often segment 4 and apex of segment 1 largely or entirely whitish, stramineous, or paler brown than is most of segment 1; wings subhyaline; abdomen ferruginous.

Specimens (161♂, 72♀): From District of Columbia; Indiana (Lafayette); Kansas (Lawrence and Miami Co.); Kentucky (Crailhope); Maryland (Bowie, Cabin John, Fort Washington in Prince Georges Co., Glen Echo, Patuxent Refuge near Bowie, Plummers Island, Solomons, and Takoma Park); Massachusetts (Sandwich and Woods Hole); Michigan (Alicia, Ann Arbor, Aurelius, East Lansing, Grosse Ile, Midland Co., Monroe Co., Roscommon Co., Shiawassee Co., and Van Buren Co.); New Hampshire (Jaffrey); New Jersey (Alpine and Moorestown); New York (Cold Spring Harbor, Islip on Long Island, and Millwood); North Carolina (Burnsville, Clinton, Crabtree Meadows in Yancey Co. at 3,600 ft., Elizabethtown, Highlands, Kill Devil Hills, Mills River, Murfreesboro, North Fork of the Swannanoa [River] in the Black Mts., Rocky Mount, and Wake Co.); Ohio (Brecksville, Cedar Point, Columbus, Hocking Co., Montgomery Co., and Union Co.); Pennsylvania (Philadelphia); South Carolina (Columbia, Greenville, and McClellanville); Tennessee (Great Smoky Mountains National Park, Chimneys Campground in Great Smoky Mountains National Park, and Knoxville); Texas (Gillespie Co. and Wharton Co.); Virginia (Arlington, Barcroft, Chain Bridge, Dunn Loring, East Falls Church, Falls Church, Glencarlyn, and Great Falls); and Wisconsin (Madison).

Collection dates are mostly in late May, June, and July. The earliest and latest records are: April 16 at Takoma Park, Md.; April 30 at Elizabethtown, N.C.; May 10 in Wharton Co., Tex., and at Great Falls, Va.; May 17 and 19 at McClellanville, S.C.; May 18, 19, and 20 at Bowie, Md.; August 5 at Crabtree Meadows, 3,600 ft., Yancey Co., N.C.; August 10 at Bowie, Md.; and August 23 at Highlands, N.C.

This subspecies occurs in the Carolinian and Austroriparian faunas.

3. Trychosis nigripes, new species

Figure 384

Front wing 5.1 to 5.5 mm. long; nervulus beyond the basal vein by about 0.19 its length; punctures on lower part of temple small, sharp, separated by about 1.4 their diameter. Structure otherwise like that of *T. similis* except that clypeus is a little smaller and more convex than the average of *similis*.

Male: Black. Palpi black, the third, fourth, and apex of second segment of maxillary palpus whitish and fifth segment of maxillary palpus dusky white; tegula black; front and middle femora and tibiae fulvoferruginous, the femora fuscous basally, especially below; front tarsus brownish fulvous, its fifth segment black, the basal 0.3 of its first segment faintly darkened; middle tarsus white, its first segment brown, darker above, its fifth segment black; hind femur infuscate, ferruginous below and basally; hind tarsus white, the fifth segment and basal half of first segment black; wings subhyaline; apical 0.2 of first tergite, all of tergites 2–4, and basal 0.2± of fifth tergite ferruginous.

Female: Black, including the palpi, flagellum, and tegula. Front femur, tibia, and tarsus fulvous brown, the femur fuscous basally and the tarsus darker apically; base and apex of hind femur, apex of middle femur, and sometimes anteroventral part of middle tibia ferruginous or tinged with ferruginous; middle and hind tarsi fuscous, brownish at the joints; wings faintly infuscate; apical 0.33 of first tergite, all of tergites 2–4, and basal 0.4 of tergite 5, ferruginous.

Type: ♀, Kerrville, Tex., Apr. 5, 1959, W. R. M. Mason (Ottawa).

Paratypes: ♂, Fredericksburg, Tex., Apr. 17, 1959, W. R. M. Mason (Ottawa). ♂, Kerrville, Tex., Apr. 4, 1959, W. R. M. Mason (Ottawa).

4. Trychosis coxalis, new species

FIGURE 385

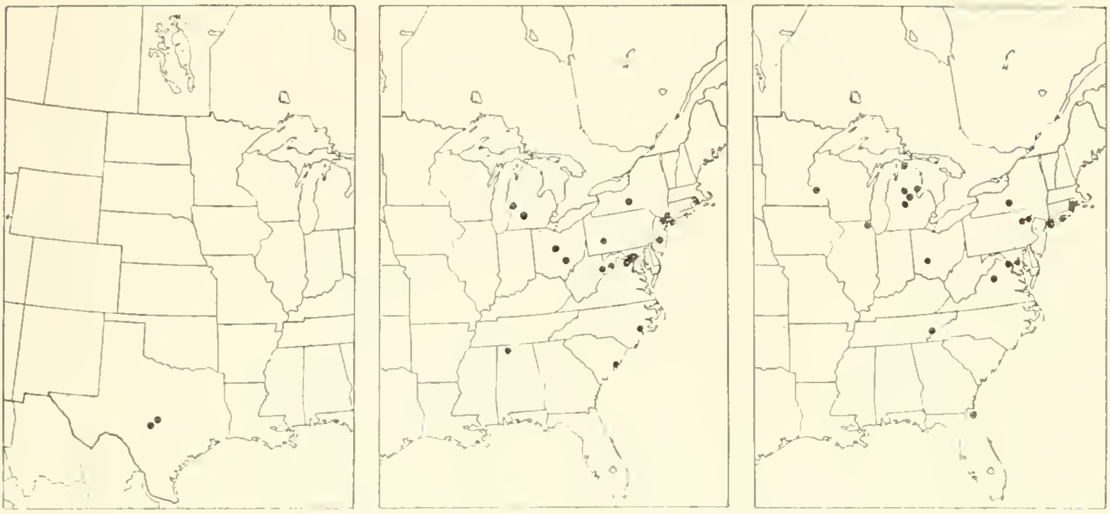
Front wing 3.7 to 5.5 mm. long; second segment of male flagellum about 2.35 as long as wide, of female flagellum about 3.7 as long as wide; punctures on lower part of temple small, separated by about 1.8 their diameter; hind femur of male about 5.1 as long as deep, of female about 5.0 as long as deep. Agrees structurally with *T. similis* except for slightly shorter flagellar segments, average smaller size, and minor other differences.

Male: Black. Palpi, sometimes spot on front of scape, and tegula white; front coxa white, fulvous behind; middle coxa fulvous, white apically in front; front and middle trochanters entirely or mostly white; front and middle femora and tibiae fulvous, the tibiae white dorsally; scutellum usually with a ferruginous stain; hind coxa fulvous, or sometimes more or less brownish; hind trochanters and femur fulvoferruginous, the second trochanter largely whitish and apex of femur weakly infuscate; hind tibia dark brown; all tarsi white, their fifth segments pale brown; wings hyaline; abdomen fulvoferruginous.

Female: Black. Palpi, tegula, and incomplete band on flagellum that occupies about 6 segments, white; basal part of flagellum brownish in front; front and middle legs, hind coxa, hind trochanters, scutellum, and abdomen fulvoferruginous, the front and middle tarsi brownish apically; hind femur fulvoferruginous, its apex a little infuscate; hind tibia dark brown; hind tarsus white or whitish, its fifth segment, basal half of first segment, and sometimes more or less of fourth segment, brown; wings hyaline.

The ferruginous coxae and white palpi and tegula distinguish this species.

Type: ♀, Moorestown, N.J., June 24, 1938, H. and M. Townes (Washington, USNM 63805).



FIGURES 185–187.—Localities: 185 (left), *Trychosis nigripes;* 186 (center), *T. coxalis;* 187 (right), *T. apicalis.*

Paratypes (20♂, 9♀): From Alabama (Killen); District of Columbia (Washington); Maryland (Glen Echo and Takoma Park); Michigan (Gull Lake Biological Station in Kalamazoo Co. and Muskegon Co.); New Jersey (Moorestown and Ramsey); New York (Armonk, Farmingdale, and Ithaca); North Carolina (New River); Ohio (Delaware Co. and Hocking Co.); Pennsylvania (Westmoreland Co.); Rhode Island (Buttonwoods); South Carolina (McClellanville); Virginia (Dead Run); and West Virginia (Cheat Mt. and Lost River State Park in Hardy Co.).

Most collection dates are in June. Those earlier or later than June are as follows: April 13 at Killen, Ala.; May 15 at McClellanville, S.C.; "April and May" at New River, N.C.; July 2 at Farmingdale, N.Y.; July 8 in Lost River State Park, Hardy Co., W. Va.; July 30 in Muskegon Co., Mich.; and "July" in Westmoreland Co., Pa.

This species occurs in the Carolinian and Austroriparian faunas.

5. Trychosis apicalis, new species

FIGURE 386

Front wing 3.2 to 5.2 mm. long; clypeus rather narrow, rather strongly convex, its apical margin moderately arcuate; temple weakly convex; cheek of moderate length, its punctures rather coarse and sharp, separated by about 0.7 their diameter, near mandible usually with a few weak horizontal wrinkles; occipital carina strong and sharp but not elevated as a lamella; second flagellar segment of male about 2.25 as long as wide, of female about 3.6 as long as wide; thorax of moderate length; notaulus rather prominent, extending about 0.3 the length of mesoscutum; punctures on mesopleurum coarse, separated by about 0.6 their diameter; propodeum of moderate length, in the female its apical carina elevated sublaterally to form rudimentary crests, mesad of these crests turned obliquely forward, either weakly continuous across the middle or interrupted; hind femur about 5.2 as long as deep in both sexes; sides of areolet subparallel; nervulus beyond basal vein by about 0.3 its length; nervellus broken near its lower 0.35; petiole with a blunt, indistinct dorsolateral and ventrolateral ridge, with some weak, fine, indistinct wrinkling but mostly smooth; second tergite subpolished, its hair sockets separated by about 0.8 the length of the hairs; ovipositor normal for the genus.

Male: Black. Basal one and one-half segments of maxillary palpus brown, the rest stramineous; labial palpus brown; tegula blackish; front coxa and front and middle first trochanters blackish brown to fulvous brown, the trochanters usually with a narrow white stripe in front; front and middle second trochanters brownish fulvous; front and middle legs beyond trochanters fulvoferruginous, their tarsi brownish apically, the median segments of middle tarsus often pale fulvous or whitish; hind femur ferruginous, its apex weakly infuscate; hind tibia and tarsus blackish brown, segments 2–4 of the tarsus and sometimes apex of segment 1 white or whitish; wings subhyaline or faintly tinged with brown; abdomen ferruginous; tergites 2 and 3 with a broad indistinct postmedian band that is faintly to strongly infuscate, tergite 4 with its apical 0.7± fuscous; fifth and following segments black.

Female: Black. Palpi brown; flagellum with a median white mark covering the upper half of about four segments, basad of the white mark blackish above and brown below, apicad of the white mark blackish brown to pale brown (the pale brown of the apical 0.4 of the flagellum of about half of the specimens of this species is a striking character, but not useful of course for those specimens in which it is darker); tegula black; coxae and trochanters dark brown to blackish, the front coxa and trochanters somewhat paler than the middle and hind ones; femora ferruginous to brownish ferruginous, the front and middle femora usually darkened basally; front and middle tibiae and tarsi brownish ferruginous; hind tibia and tarsus brown, the apical 0.4 or less of basitarsus and tarsal segments 2–4 white or whitish; wings subhyaline or with a faint brownish tinge; abdomen ferruginous, the fifth and following segments sometimes infuscate.

Type: ♀, Riverhead, Long Island, N.Y., May 10, 1952, Roy Latham (Washington, USNM 63806).

Paratypes (7♂, 22♀): From Florida (Jacksonville); Illinois (McHenry); Maryland (Bowie); Michigan (Arenac Co., Douglas Lake in Cheboygan Co., Midland Co., Missaukee Co., and Ionia Co.); Minnesota (Lake City); New York (Cold Spring Harbor, Farmingdale, Ithaca, and Riverhead); Ohio (Montgomery Co.); Pennsylvania (Paupack and Spring Brook); Rhode Island (Kingston and Westerly); Tennessee (Great Smoky Mountains National Park); and Virginia (Falls Church and Skyline Drive).

Collection dates are from late spring to early August. The earliest and latest records are: May 10 at Riverhead, N.Y.; May 22 at Ithaca, N.Y.; August 2 in Montgomery Co., Ohio; August 5 on the Skyline Drive, Va.; and August 13 at Westerly, R.I.

This species is widely distributed in eastern United States.

6. Trychosis sulcata, new species

FIGURE 387

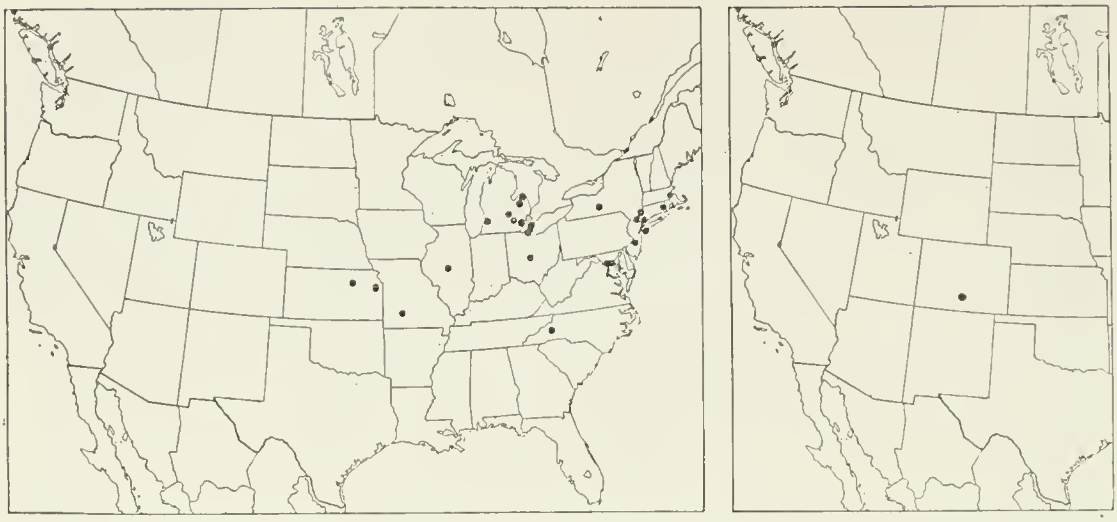
Front wing 4.2 to 6.5 mm. long; second segment of male flagellum about 2.6 as long as wide, of female flagellum about 4.8 as long as wide; hind femur about 5.6 as long as deep in male, about 5.4 as long as deep in female; notaulus strongly impressed, especially in male, reaching a little beyond center of mesoscutum. Structure otherwise as described for *T. apicalis*.

Male: Black. Palpi white, the basal 0.7± of their first segments brownish; tegula black; second trochanters fuscoferruginous; femora ferruginous, the apex of hind femur infuscate; front and middle tibiae and front tarsus fulvous, the fifth segment of front tarsus brown; middle tarsus fulvous brown, its fifth segment brown; hind tibia black; hind basitarsus black, often its apical 0.4 or less white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black; wings subhyaline; first segment of abdomen varying from ferruginous to black; tergites 2 and 3 black, the apical 0.35± more or less infuscate; tergites 4 and following black, the base of tergite 4 often ferruginous.

Female: Black. Palpi white, the basal 0.7± of their first segments brown; flagellum blackish brown, brown below, with a median white incomplete band that covers about 3.4 segments; tegula black; second trochanters partly ferruginous or fulvous or stained with these colors; front and middle legs beyond trochanters fulvous, their tarsi brown apically; hind femur ferruginous, its apex infuscate; hind tibia blackish, more or less brownish basally and below; hind basitarsus blackish, its apical 0.4 or less often whitish; segments 2–4 of hind tarsus whitish and segment 5 black; wings subhyaline; first abdominal segment ferruginous apically, shading to blackish basally; tergites 2 and 3 ferruginous; tergites 4 and following black, the apical margins of tergites 4 and 5 usually ferruginous.

The long notauli, black fourth tergite, black tegula, and white palpi distinguish this species.

Type: ♀, Moorestown, N.J., Aug. 13, 1939, H. and M. Townes (Washington, USNM 63807).



Figures 188, 189.—Localities: 188 (left), *Trychosis sulcata;* 189 (right), *T. sanderi.*

Paratypes (5♂, 30♀): From Connecticut (Voluntown); Illinois (Harristown in Macon Co.); Kansas ("Blackjack Creek" in Pottawatomie Co. and Wyandotte Co.); Maryland (Bowie and Takoma Park); Massachusetts (Holliston); Michigan (Ann Arbor, George Reserve in Livingston Co., Huron Co., Tuscola Co., Van Buren Co., and Wayne Co.); Missouri (Springfield); New Jersey (Moorestown); New York (Fire Island, Greenwood Lake, Millwood, Poughkeepsie, and Six Mile Creek in Ithaca); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft.); Ohio (Delaware Co., and Put-in-Bay on South Bass Island); and Ontario (Pelee Island and Point Pelee).

Collection dates are mostly from June 21 to August 13. Those outside of this range are: May 30 at Bowie, Md.; May 31 in Wayne Co., Mich.; August 21 in the George Reserve, Livingston Co., Mich.; August 23 at Ithaca, N.Y.; and August 29 at Voluntown, Conn.

This species occurs mostly in the Carolinian fauna.

7. Trychosis sanderi (Dalla Torre)

Cryptus monticola Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 410; ♀. Name preoccupied by Cameron, 1885. Type: ♀, Veta Pass, Colo. (Washington).

Cryptus sanderi Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 587. New name.

Male: Unknown.

Female type: Front wing 6.5 mm. long. Similar in general structure to *T. semirubra* except for the larger size, notaulus 0.25 as long as mesoscutum, and hind femur 5.0 as long as deep. Type lacks antennae.

Black. Palpi fuscous. Front femur brownish fulvous, its basal 0.3± brown; front tibia and tarsus brownish fulvous; middle leg beyond trochanters brown, the apex of its femur a little paler; hind femur rather light brown; hind tibia and tarsus dark brown; wings faintly infuscate; abdomen dark ferruginous, the basal 0.7 of its first segment black and tergites 7 and 8 fuscous.

Redescribed from the type. No other specimens are known.

8. Trychosis semirubra Townes

Figure 388

Front wing 3.7 to 5.6 mm. long; clypeus small, very strongly convex, its apical margin weakly arcuate; mandible small; temple rather strongly convex; cheek of moderate length, with coarse, strong, adjacent or subadjacent punctures and usually also with some horizontal wrinkling that partially obscures the punctures; occipital carina strong and sharp but not elevated as a lamella; second segment of flagellum about 2.0 as long as wide in male, about 2.6 as long as wide in female (averaging shorter than in any other species); thorax short and stout; notaulus usually distinct and sharp but sometimes indistinct, about 0.18 as long as mesoscutum; punctures on mesopleurum rather coarse, strong, separated by about 0.3 their diameter; propodeum rather short, in female the apical carina broadly interrupted medially, sublaterally forming a broad, rudimentary crest; hind femur of male about 4.8 as long as deep, of female about 4.5 as long as deep; sides of areolet usually rather strongly convergent forward; nervulus beyond basal vein by about 0.28 its length; nervellus broken near its lower 0.42; petiole short, flattened above, with rather distinct dorsolateral and ventrolateral longitudinal ridges, its sides with fine, weak rugulosity in male, in female almost smooth; first sternite with fine, weak longitudinal wrinkling (best developed in male) and a tendency to be bounded apically on each side by a weak carina that represents lower edge of the tergite; second tergite subpolished, its hair sockets separated by about the length of the hairs; ovipositor normal for the genus.

The small size, stout build, short flagellar segments, small, strongly convex clypeus, convex temple, and very coarse, dense punctures on cheek distinguish this species.

There are three subspecies, as keyed and described below:

1. Hind femur blackish; range: Arizona. **8c. semirubra arizonica,** new subspecies
   Hind femur entirely or mostly ferruginous or brownish ferruginous 2
2. Hind basitarsus of male blackish brown, its apical 0.1± sometimes pale brown or whitish; flagellum of female entirely blackish; range: Rocky Mountains to Pacific Ocean . . . . **8a. semirubra pulla,** new subspecies
   Hind basitarsus of male whitish, its basal 0.35± brown; flagellum of female with a median white mark; range: Atlantic Ocean to Rocky Mountains. **8b. semirubra semirubra** Townes

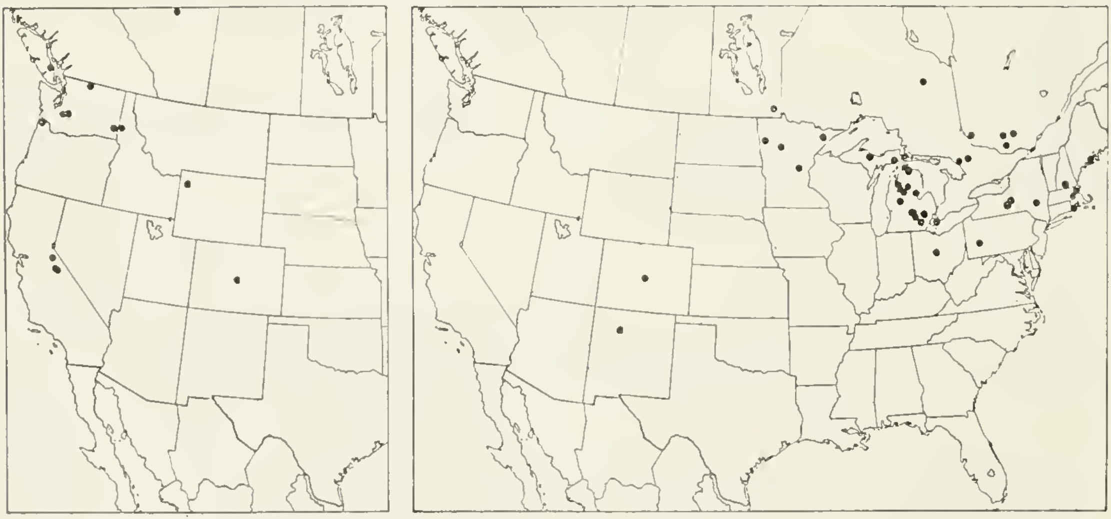
8a. Trychosis semirubra pulla, new subspecies

Punctation a little weaker than in the subspecies *semirubra* and *arizonica.*

Color as in the subspecies *semirubra* except that palpi, flagellum, coxae, and trochanters average a little darker; female flagellum is without a median white mark; segments 2–4 of middle tarsus of male are not paler than the middle basitarsus; hind basitarsus of male is blackish brown but sometimes with its extreme tip pale; tergite 5 of male is often largely ferruginous; and tergites 5 and following of female usually are mostly or entirely ferruginous.

Type: ♀, Ashford, Wash., July 27, 1940, H. and M. Townes (Washington, USNM 63808).

Paratypes: ♂, Edmonton, Alta., June 9, 1950, E. H. Strickland (Townes). ♀, Bowser, B.C., June 21, 1955, J. B. McGillis (Ottawa). ♂, Dardanelle, Calif., July 5, 1948, H., M., G., D., and J. Townes (Townes). 3♂, near Glacier Point, Yosemite Park, Calif., July 18 and 24, 1948, H., M., G., D., and J. Townes (Townes). ♂, Tamarack Flat, Yosemite Park, Calif., July 24, 1948, H., M., G., D., and J. Townes (Townes). ♂, Yosemite Park, 3,800 to 4,000 ft., Calif., May 26, 1928, E. O. Essig (Berkeley). ♂, reared from egg sac of drassid spider attached to under side of stone, South Cheyenne Canyon, El Paso Co., Colo., collected Apr. 2, 1915, emerged Apr. 19, 1915, Champlain (Washington). 2♂, Colorado (Washington). ♀, Moscow Mt., Idaho, July 8, 1911 (St. Paul). ♀, Olney, Oreg., June 15, 1925, E. C. Van Dyke (San Francisco). ♀, Ashford, Wash., July 6, 1940, H. and M. Townes (Townes). ♀, Elbe, Wash., July 25, 1940, H. and M. Townes (Townes). ♀, Oroville, Wash. (Cambridge). ♀, Wawawai, Wash., May 12, 1933, R. D. Shenefelt (Madison). ♀,



Figures 190, 191.—Localities: 190 (left), *Trychosis semirubra pulla;* 191 (right), *T. s. semirubra.*

Jenny Lake, Grand Tetons, Wyo., June 28, 1938, E. C. Van Dyke (Townes).

This subspecies ranges from the Rocky Mountains to the Pacific Ocean, from Colorado and central California northward into Canada.

8b. Trychosis semirubra semirubra Townes

Phygadeuon annulatus Provancher, 1875, Naturaliste Canadien, vol. 7, pp. 179, 182; ♀. Name preoccupied by Cresson, 1864. Type: ♀, Quebec (Quebec).
Trychosis semiruber Townes, 1944, Mem. Amer. Ent. Soc., no. 11, p. 254. New name.

Male: Black. Maxillary palpus white, its first segment brown; labial palpus brown; tegula blackish brown; front and middle legs beyond trochanters fulvous, their fifth tarsal segments brown and segments 2–4 of middle tarsus paler fulvous or whitish; middle femur often darkened basally; second hind trochanter partly ferruginous; hind femur ferruginous, its apex weakly infuscate; hind tibia blackish brown; segments 1–4 of hind tarsus white, the basal 0.3± of the first segment brown; segment 5 of hind tarsus dark brown; wings tinged with brown; abdomen ferruginous, the first segment darkened basally; tergites 5 and following largely or entirely black. Sometimes tergite 4 is weakly infuscate apically.

Female: Black. Palpi dark brown, the last three segments of maxillary palpus light brown; flagellum blackish brown, brown basally beneath, with a white incomplete band that covers about four segments; tegula blackish brown; coxae and trochanters reddish brown to blackish brown; front and middle legs beyond trochanters dull brownish fulvous, their tarsi a little darker apically; hind femur brownish fulvous; hind tibia dark brown; hind tarsus brown, its second through fourth segments paler brown or tinged with whitish; wings tinged with brown; abdomen ferruginous, its first segment usually a little darkened basally, tergites 5 and following fuscous.

A series of one male and three females was reared from the lenticular egg cocoons of a drassid spider found under stones in South Cheyenne Canyon, Colorado. The females have a white mark on the flagellum, so are classified with this subspecies, while the male has the hind basitarsus entirely blackish and is classified with the subspecies *pulla*. This arbitrary division of a series into two subspecies will raise the eyebrows of some of our friends, yet if one establishes subspecific categories on certain characters, ignoring those characters in inconvenient cases means a subjective sorting of specimens, which may be less defensible than the division made here. To classify such a series as "intermediate" means the establishment and definition of an "intermediate" category, which only adds another division which may itself be more arbitrary than the original two subspecies.

Specimens (27♂, 29♀): From Colorado (South Cheyenne Canyon in El Paso Co.); Maine (Lincoln Co.); Manitoba (Sandilands); Massachusetts (Auburndale and Holliston); Michigan (Ann Arbor, Bay Co., Clare Co., Douglas Lake, East Lansing, George Reserve in Livingston Co., Grand Traverse Co., Marquette Co., Mecosta Co., Milford, Missaukee Co., Naubinway, Roscommon Co., Rudyard, and Topinabee in Cheboygan Co.); Minnesota (Crookston, Eagle Nest in St. Louis Co., Itasca Park, and Mille Lacs Co.); New Hampshire (Jaffrey); New Mexico (Jemez Springs); New York (Ithaca, Labrador Lake in Cortland Co., and Maplecrest in Catskill Mts.); Northwest Territories (Reindeer Depot on Mackenzie Delta); Ohio (Delaware Co.); Ontario (Leamington, Kearney, Smoky Falls on Mattagami River, and Waubamick); Pennsylvania (Allegheny Co.); Quebec (Cascapedia, Kazabazua, Laniel, Maniwaki, and Nominingue); Rhode Island (Westerly); and Texas.

Collection dates are from mid-spring to mid-summer. The earliest and latest dates are: May 3 at Leamington, Ont.; May 14 at Milford, Mich.; May 15 at Ann Arbor, Mich.; May 18 in Missaukee Co., Mich.; July 16 in Itasca Park, Minn.; July 19 at Topinabee, Cheboygan Co., Mich.; and July 24 at Ithaca, N.Y.

Reared specimens are as follows: ♂, reared from larva in frass nest, Sandilands, Man., material collected Sept. 23, 1937, emergence Feb. 2, 1938, H. A. Richmond. 3♀, from drassid spider egg cases under stone, South Cheyenne Canyon, Colo., collected Apr. 2, 1915, emerged Apr. 22 and 23, 1915, A. B. Champlain.

This subspecies ranges from the Atlantic Ocean to the Rocky Mountains, in the Transition and Canadian zones.

8c. Trychosis semirubra arizonica, new subspecies

Black. Palpi fuscous; tegula black; front and middle legs beyond trochanters light brown, their femora infuscate basally; hind femur blackish brown; hind tarsus blackish, in male the segments 2 through 3 white, in female these segments dark brown, paler at the incisures; wings faintly tinged with brown; first abdominal segment ferruginous apically; tergites 2–3 of male dark ferruginous; tergites 4 and following of male either black or partly ferruginous (in the single male specimen at hand they are black but this may be due to staining); tergites 2–4 of female ferruginous, the rest black; tergite 4 with a weak apical infuscation.

Type: ♀, near Alpine, Ariz., May 25, 1947, H. and M. Townes (Washington, USNM 63809).

Paratype: ♂, near Alpine, Ariz., May 30, 1947, H. and M. Townes (Townes).

9. Trychosis latidens, new species

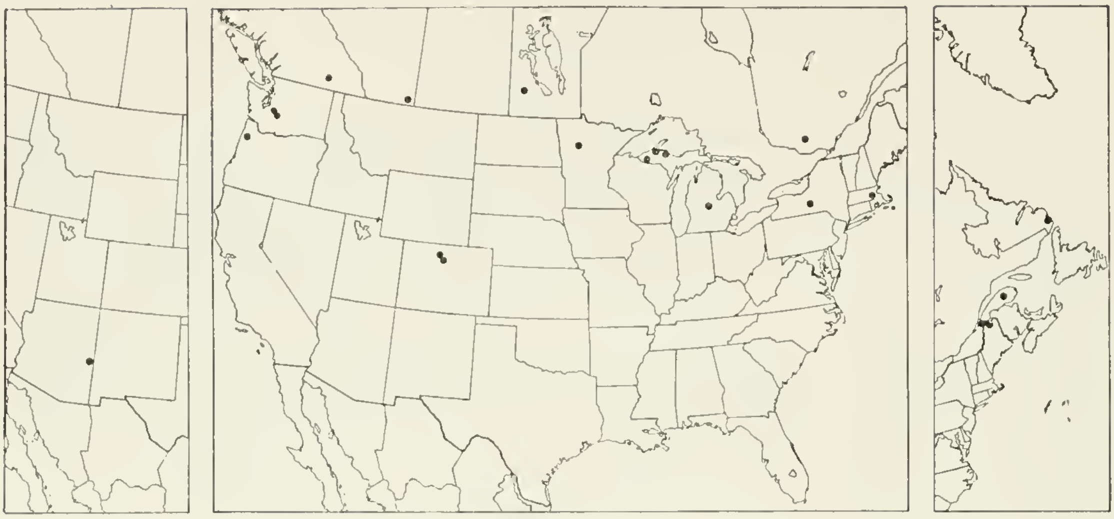
FIGURE 389

Front wing 5.2 to 7.2 mm. long; clypeus unusually wide, very strongly convex, its apical margin moderately arcuate; mandible large, unusually wide; temple moderately convex; cheek rather long, usually partly mat, often with some weak horizontal wrinkling, its punctures of moderate size, separated by about 0.6 their diameter; occipital carina strong and sharp, rather high but not lamellalike; second segment of flagellum about 2.4 as long as wide in male, about 3.75 as long as wide in female; thorax moderately long; notaulus about 0.25 as long as mesoscutum; punctures on mesopleurum small, separated by about 0.4 their diameter; propodeum of moderate length, in the female its apical carina rather weak, sublaterally forming rudimentary crests, medially weak or obsolete, if present medially curved forward and making a broad "U" on the midline; hind femur about 5.3 as long as deep in male, about 4.8 as long as deep in female; sides of areolet weakly convergent or subparallel; nervulus beyond basal vein by about 0.3 its length; nervellus broken near its lower 0.45; petiole moderately long, with weak dorsolateral and ventrolateral ridges, its lateral face with indistinct, weak, fine wrinkling that is weaker in female than in male; second tergite weakly mat, its hair sockets separated by about 0.7 the length of the hairs but often sparser near midlength of the tergite; ovipositor normal for the genus.

Male: Black. Palpi fuscous, segments 3 and 4 and apex of segment 2 of maxillary palpus yellowish; tegula black; front and middle legs beyond trochanters ferruginous, the fifth segments of their tarsi dark brown; hind femur ferruginous; hind tibia ferruginous to dark ferruginous brown; hind basitarsus brown, a little paler at base and apex, the apical 0.2± sometimes whitish; segments 2–4 of hind tarsus whitish; segment 5 of hind tarsus dark brown; wings tinged with brown; apical 0.35± of tergite 1, all of tergites 2–4, and often basal part of tergite 5, ferruginous.

Female: Black. Palpi fuscous, the apical three segments of maxillary palpus brown; color otherwise as in male except that whitish marking of hind tarsus is often partly obscured or entirely replaced by brown. There is sometimes a whitish tinge on upper side of one to three segments of flagellum, near its midlength. A specimen from Peaceful Valley, Colo., has the tergites 5 and 6 entirely ferruginous.

This species is near *T. semirubra* but differs in the larger size, larger mandible, wider clypeus, longer notaulus, and more slender proportions.



Figures 192–194.—Localities: 192 (left), *Trychosis semirubra arizonica;* 193 (center), *T. latidens;* 194 (right), *T. fuscata.*

Type: ♀, Mount Rainier, Wash., 5,300 ft., Aug. 16, 1940, H. and M. Townes (Washington, USNM 63810).

Paratypes (6♂, 25♀): From Alberta (Onefour); British Columbia (Fort Nelson and Robson); Colorado (near Estes Park and Peaceful Valley); Manitoba (Riding Mountain Park); Massachusetts (Hopkinton); Michigan (Alston in Houghton Co., Gogebic Co., Gratiot Co., and Yellow Dog Plains in Marquette Co.); Minnesota (Itasca Park); New York (Ithaca); Ontario; Oregon (Grande Ronde in Union Co.); Quebec (Kazabazua); Washington (Carbonado and Mount Rainier at 4,700, 5,300, and 5,700 ft.); and Yukon Territory (Watson Lake).

Collection dates are from late May to mid-August. The earliest and latest dates are: May 22 at Hopkinton, Mass.; May 26 at Robson, B.C.; August 15 and 16 at 5,300 ft. on Mount Rainier, Wash.; and "August" at Peaceful Valley, Colo.

In our experience the usual habitat is moist meadows among scattered trees.

This species is transcontinental, mostly in the Canadian zone.

10. Trychosis fuscata, new species

Figure 390

Front wing 5.9 to 6.3 mm. long; clypeus of moderate size, strongly punctate and strongly convex, its apical margin weakly arcuate; mandible rather large; temple moderately convex; cheek of moderate length, very strongly mat and with moderately large, adjacent punctures, not distinctly wrinkled; occipital carina strong and sharp but not raised as a lamella; second segment of flagellum 2.3 as long as wide in male, about 3.0 as long as wide in female; thorax rather short and stout; notaulus about 0.25 as long as mesoscutum; punctures on mesopleurum rather small, separated by about 0.4 their diameter or in some places closer together; propodeum of moderate length, its apical carina complete but laterally and medially weak, produced sublaterally to form weak crests, mesad of the crests trending forward to form a broad rounded angle at the midline; sides of areolet usually weakly convergent; nervulus beyond basal vein by about 0.25 its length; nervellus broken near its middle; petiole rather short and broad, with a ventrolateral longitudinal carina and a weak dorsolateral longitudinal ridge, its lateral face with strong, fine, irregular wrinkles; first sternite covered with fine weak wrinkling that has a mostly longitudinal direction, the apical half of the sternite bounded on each side by a weak longitudinal carina that represents the ventral edge of the sternite (the only other species with this carina well developed is *T. albitarsis*); second tergite subpolished, with unusually short, dense hairs, the hair sockets separated by about 0.8 the length of the hairs; ovipositor a little shorter than usual (the sheath about 0.24 as long as front wing), its nodus a little weaker than normal for the genus.

Male: Black. Maxillary palpus white, its last segment dusky and its first one and a half segments fuscous; labial palpus fuscous, the apex of its third segment white in front; tegula black; front and middle femora dark brown, paler apically (especially the front femur); front and middle tibiae and front tarsus light brown; middle tarsus light brown, the median three segments white, the fourth segment with a median apical brown spot; hind tarsus white, the apical 0.4 of its last segment brown; wings faintly tinged with brown; tergites 2 and 3 dusky brown; narrow apical margins of tergites 1–4 and thyridia ferruginous.

Female: Black. Palpi and tegula black; flagellum with a median incomplete band that covers 4.6 segments; front tibia and all tarsi dark brown, the tarsi pale at the joints and segments 2–4 of hind tarsus white with their apices brownish; apex of segment 1 of hind tarsus sometimes white; wings faintly tinged with brown; very narrow apical margins of tergites 1 and 4, wider apical margins of tergites 2 and 3, and thyridia, ferruginous.

Type: ♀, Cartwright, Labrador, July 12, 1955, E. F. Cashman (Ottawa).

Paratypes: ♀, same data as type (Ottawa). ♀, 14 miles southeast of Fort Kent, Maine, July 8, 1950, J. B. Cope (Patuxent). ♂, Mount Lyall, 1,500 ft., Que., July 4, 1933, W. J. Brown (Ottawa). ♀, Parke Reserve, Kamouraska Co., 950 ft., Que., July 11, 1947, W. R. M. Mason (Ottawa).

11. Trychosis albitarsis (Cresson)

Figure 391

Front wing 5.7 to 8.2 mm. long; punctures on head, thorax, and legs exceptionally small and dense; clypeus large, closely punctured, very strongly convex, its apical margin moderately arcuate; temple weakly convex; cheek long, with strong crowded punctures and usually with some short horizontal wrinkling, near the occipital carina the wrinkles often making strong rugae; occipital carina sharp, high, its lower part often forming a lamella that may be as high as the width of third segment of maxillary palpus; second segment of flagellum about 2.5 as long as wide in male, about 3.2 as long as wide in female; thorax stout; notaulus distinct or indistinct, extending about 0.25 the length of mesoscutum; punctures on mesopleurum small, sharp, mostly adjacent; propodeum moderately short, its apical carina forming a short, weak sublateral crest, angled forward a little between the crests but more nearly horizontal than usual, the median part weak or sometimes absent; hind femur about 5.4 as long as deep in male, about 5.1 as long as deep in female; sides of areolet weakly convergent or subparallel; nervulus beyond basal vein by about 0.45 its length; nervellus broken near its lower 0.45; petiole rather wide, with a distinct ventrolateral longitudinal carina and dorsolateral longitudinal ridge, its lateral face with fine but rather strong, irregularly vertical wrinkling; first sternite with fine, irregular, longitudinal wrinkling, its apical 0.45± bordered laterally by a carina that represents the lower edge of first tergite (this carina shorter or absent in all other species except *T. fuscata*); second tergite subpolished, with short, exceptionally dense hairs (denser in female than in male), the sockets of which are separated by about 0.65 the length of the hairs; nodus of ovipositor unusually weak; ovipositor sheath about 0.24 as long as front wing.

The small, dense punctures on the head, body, and legs, longitudinally wrinkled first sternite of which the apical 0.45± is bordered laterally by a carina, and ferruginous second and third tergites are distinctive. The character of the wrinkled and bordered first sternite occurs also in *T. fuscata*, but in that species the second and third tergites are blackish. The species *semirubra* and *latidens* tend to have the first sternite wrinkled and bordered, but not as definitely as in *albitarsis* and *fuscata*.

There is an eastern and a western subspecies, as keyed and described below:

1. Apical 0.4 or less of male hind basitarsus whitish; female flagellum without a median white band; range: Rocky Mountains to Pacific Ocean.
11a. albitarsis peratra, new subspecies

Apical 0.5 or more of male hind basitarsus whitish; female flagellum with a median white band; range: Atlantic Ocean to 100° west longitude.
11b. albitarsis albitarsis (Cresson)

11a. Trychosis albitarsis peratra, new subspecies

The punctation of head, body, and legs averages a little less fine and dense than in the subspecies *albitarsis* and the flagellar segments average a little shorter. The most reliable differences, however, are in color.

Differs in color from the subspecies *albitarsis* in having the female flagellum entirely black, male hind basitarsus dark brown with its apical 0.4 or less ivory, female hind tarsus always entirely brown, wings with a definite brown tinge, femora of female always ferruginous, and abdomen more extensively ferruginous. The first abdominal segment usually has only its basal half infuscate, tergite 5 is always ferruginous, and tergites 6–8 vary from fuscous to entirely ferruginous.

Type: ♀, Gold Lake, Sierra Co., Calif., July 29, 1921, C. L. Fox Collection (San Francisco).

Paratypes: ♀, on *Abies lasiocarpa*, Lorna, B.C., July 2, 1925, H. Richmond (Ottawa). ♀, Big Basin, Calif., July 21, 1948, C. A. Downing (Davis). ♀, Donner Pass, Calif., Aug. 1, 1948, H., M., G., and D. Townes (Townes). ♂, Glen Alpine, Tahoe, Calif., July 14, 1915, E. P. Van Duzee (Berkeley). ♀, Leland Meadow, Tuolumne Co., Calif., July 16, 1957, J. W. MacSwain (Townes). ♂, Sagehen near Hobart Mills, Calif., July 9, 1954, G. Schaefers (Berkeley). ♀, Yosemite Canyon, Calif., July 30, 1933 (Davis). ♂, near Estes Park, Colo., June 12, 1948, H., M., G., D., and J. Townes (Townes). ♂, Moscow Mt., Idaho, July 7, 1918, A. L. Melander (Cambridge). ♀, Mount Constitution, Wash., July 1909 (Cambridge). ♂, Mount Rainier, Wash., July 4, 1934, Bryant (San Francisco). ♂, San Juan Island, Wash., July 1–7, 1909, W. M. Mann (Washington). ♀, Sol Duc Hot Springs, Clallam Co., Wash., June 20, 1936, E. C. Van Dyke (San Francisco). ♀, Summerland Trail, Mount Rainier, Wash., July 24, 1924, A. L. Melander (Townes).

This subspecies ranges from the Rocky Mountains to the Pacific Ocean, in the Transition and Canadian zones.

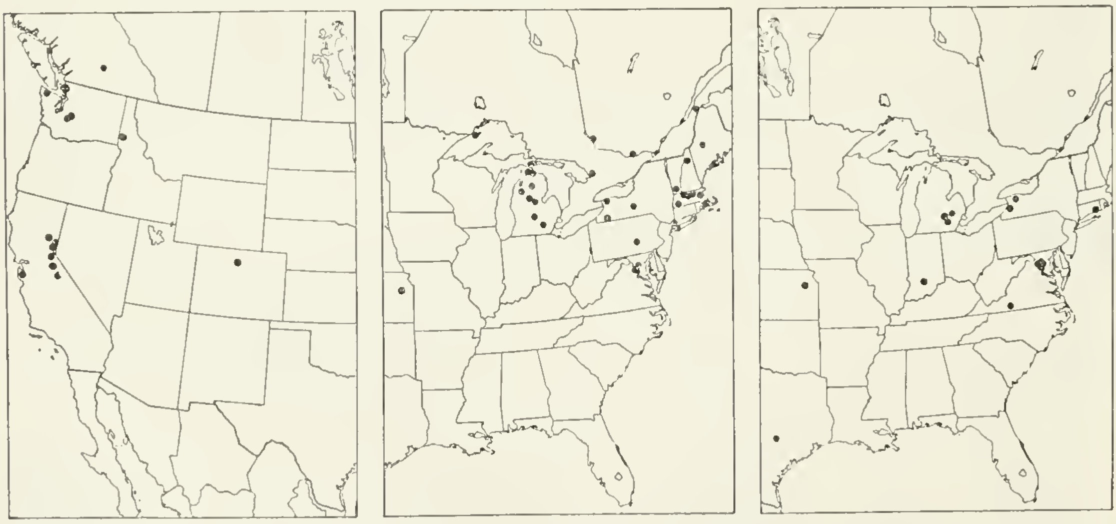
11b. Trychosis albitarsis albitarsis (Cresson)

Cryptus albitarsis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 300; ♂. Type: ♂, Delaware (Philadelphia).

Male: Black. First segment and basal 0.7± of second segment of maxillary palpus dark brown, the rest of the palpus usually white except that fifth segment is pale brown; labial palpus brown; tegula black; front and middle first trochanters often with a white stripe in front; front and middle legs beyond trochanters fulvoferruginous, the femora usually infuscate basally and the fifth tarsal segments dark brown; hind femur ferruginous, faintly darkened at base and apex; hind tibia dark brown; hind tarsus ivory, the basal 0.3± of its first segment and all of its last segment brown; wings faintly infuscate; apical 0.35± of first tergite, all of tergites 2–4, and usually basolateral blotches on tergite 5, or sometimes most of tergite 5, ferruginous.

Female: Black. Palpi dark brown, the last 3.3 segments of maxillary palpus medium brown; flagellum with a white band (tinged with brown below) that covers about five segments; tegula blackish brown; coxae and trochanters reddish brown to blackish; femora dull ferruginous to blackish brown, the front femur always ferruginous in front; front and middle tibiae ferruginous to reddish brown; hind tibia dark reddish brown; tarsi light reddish brown, segments 2–4 of hind tarsus and apical 0.3± of segment 1 of hind tarsus more or less yellowish white; wings faintly infuscate; apical 0.35± of first tergite and all of tergites 2–4 dull ferruginous; tergites 5 and following fuscous to dull ferruginous.

Specimens (12♂, 31♀): From Kansas (Baldwin); Maine (Capens and Lincoln Co.); Maryland (Plummers Island); Massachusetts (Dorchester, Fall River, Lunenburg, Mount Everett in Berkshire Co., Petersham, and Warwick); Michigan (Ann Arbor, Cheboygan Co., Clare Co., Crawford Co., Douglas Lake, East Lansing, Isle Royale, Mackinac Island, Midland Co., and Wexford Co.); Newfoundland (Little River—Codroy); New Hampshire (Randolph); New York (Allegany State Park, Belmont Lake State Park, Gardiners Island, Ithaca, New Rochelle, and Olcott); Ontario (Gravenhurst in Muskoka District); Pennsylvania (Rockville); Quebec (Laniel, Parke Reserve,



FIGURES 195–197.—Localities: 195 (left), *Trychosis albitarsis peratra;* 196 (center), *T. a. albitarsis;* 197 (right), *T. albicaligata.*

and Queen's Park in Aylmer); Vermont (Bennington); and Virginia (Black Pond in Fairfax Co.).

Collection dates are all from June 1 to July 19, except one for "May" at Baldwin, Kans.

This subspecies ranges from the Atlantic Ocean to 100° west longitude, in the Transition and Canadian zones.

12. Trychosis albicaligata (Walsh)

Figure 392

Cryptus albicaligatus Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 82; ♂. Type: ♂, Illinois? (destroyed in Chicago fire of 1871).

Similar to *T. exulans* in size, structure, and color except as follows: Clypeus a little less convex; head a little wider; temple distinctly convex; lower part of occipital carina elevated as a low lamella that is about 0.4 as wide as third segment of maxillary palpus; blackish colors of body averaging a little darker; and base of hind tibia of male entirely blackish, never with a basal dorsal light brown area.

The original description of *albicaligatus* agrees with both this species and with *T. exulans*. The type is destroyed. As first revisers, we restrict the name to the present form. It may turn out to be only a variety of *exulans*, as the difference is small and a few specimens tend to be intermediate.

Specimens (10♂, 6♀): From Connecticut (Lyme); District of Columbia (Washington); Indiana (Lawrence Co.); Kansas (Lawrence); Maryland (Takoma Park); Michigan (Ann Arbor, George Reserve in Livingston Co., and Oakland Co.); New York (Hamburg and Medina); Texas (Austin); and Virginia (Falls Church, Meadows of Dan, and Vienna).

Collection dates are from mid-spring to early summer. The earliest and latest records are: April 22 at Vienna, Va.; April 28 at Meadows of Dan, Va.; May 2 at Takoma Park, Md.; June 14 at Lyme, Conn.; and June 23 in Oakland Co., Mich.

This species occurs in the Carolinian fauna.

13. Trychosis exulans (Cresson)

Figure 393

Cryptus exulans Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 157; "♂"= ♀. Type: ♀, Comal Co., Tex. (Philadelphia).

Front wing 6.3 to 8.8 mm. long; clypeus rather small, moderately convex, its apical margin weakly arcuate except laterally, where it is strongly upcurved; temple faintly concave, flat, or sometimes faintly convex, next to occipital carina faintly to distinctly convex; cheek long, with coarse crowded punctures; occipital carina sharp, its lower part forming a lamella that is about 1.0 as high as width of segment 3 of maxillary palpus; second segment of flagellum about 2.8 as long as wide in male, about 4.25 as long as wide in female; thorax moderately long; horizontal portion of epomia unusually strong, the vertical portion weak or absent; notaulus absent or indistinct; punctures on mesopleurum rather coarse, separated by about 0.5 their diameter; propodeum of moderate length, the sublateral portion of its apical carina forming a broad, moderately strong crest, which is slanted somewhat forward; median portion of apical carina absent or very weak; sides of areolet somewhat convergent, or sometimes parallel; nervulus beyond basal vein by about 0.19 its length; nervellus broken near its middle; petiole rather long, its dorsolateral and ventrolateral angles moderately strong in male, weak in female, its lateral face with some weak longitudinal wrinkling in male, almost smooth in female; second tergite polished or subpolished, its hair sockets separated by about 0.8 the length of the hairs; ovipositor normal for the genus.

Male: Black. Maxillary palpus white, its first segment dark brown and last segment light brown; labial palpus brown; scape rarely with a white spot in front; tegula dark brown to black; trochanters reddish brown to blackish brown, the front first trochanter usually with a white stripe in front; front femur stramineous in front and apically, the rest dark brown; middle femur blackish brown, its apex and a narrow stripe in front stramineous; front and middle tibiae white, stramineous below; front and middle tarsi white, their fifth segments entirely brown or brown with the base whitish; base of hind tibia brown to stramineous, usually with a short pale stripe on upper side; hind tarsus white, the basal 0 to 0.3 of its basitarsus and apical 0.4± of its fifth segment brown; wings subhyaline; abdomen entirely ferruginous or the petiole sometimes infuscate or black.

Female: Black. Clypeus and scutellum sometimes tinged with ferruginous; palpi fuscous; flagellum usually with a median dorsal white mark that covers about three segments; tegula dark brown; front and middle femora and tibiae dark brown, the front femur and tibia pale brown in front, the middle femur and tibia medium brown in front; front and middle tarsi brown, their fifth segments darker; hind tarsus dark brown or fuscous, the middle three segments often somewhat paler or whitish; wings subhyaline; abdomen ferruginous.

The male of this species is recognizable by the front and middle tibiae white above, hind basitarsus mostly white, hind femur blackish, and temple flat or weakly concave. The female is distinguished by a more complex group of characters, as described in the key.

Specimens (93♂, 47♀): From Arkansas (Baldwin); Connecticut (Hamden and South Windsor); District of Columbia (Anacostia and

Washington); Indiana; Kansas (Baldwin, Cowley Co. at 1,114 ft., Johnson Co., Leavenworth Co., and Montgomery Co. at 798 ft.); Kentucky (Crailhope); Louisiana (Frierson); Maryland (Beltsville, Cabin John, College Park, Glen Echo, Patuxent Refuge near Bowie, Plummers Island, and Takoma Park); Massachusetts (Beach Bluff, Bourne, and Lexington); Michigan (East Lansing, George Reserve in Livingston Co., Gratiot Co., Mecosta Co., Midland Co., Monroe Co., Saginaw Co., St. Joseph, and Washtenaw Co.); Missouri (Clayton); New Jersey (Moorestown); New York (Fire Island, Long Beach, Millwood, and Rockaway); North Carolina (Lake Junaluska and Raleigh); Ohio (Delaware Co., Franklin Co., Hocking Co., Pickaway Co., Put-in-Bay, and Warren Co.); Ontario (East Sister Island); Pennsylvania (Carlisle Junction, Harrisburg, Linglestown, Pittsburgh, trail to Boathouse Pond near Presque Isle in Erie Co., and Westmoreland Co.); Rhode Island (Westerly); Tennessee (Chimneys Campground in Great Smoky Mountains National Park at 2,800 ft. and Elkmont in Great Smoky Mountains National Park); Texas (Austin, Fort Sam Houston, and Jewett); Virginia (Barcroft, Black Pond in Fairfax Co., Chain Bridge, Dixie Landing, Dunn Loring, East Falls Church, Falls Church, Glencarlyn, Great Falls, Paeonian Spring, and Vienna); and West Virginia (Cheat Mt. at 2,000 ft. and Monongalia Co.).

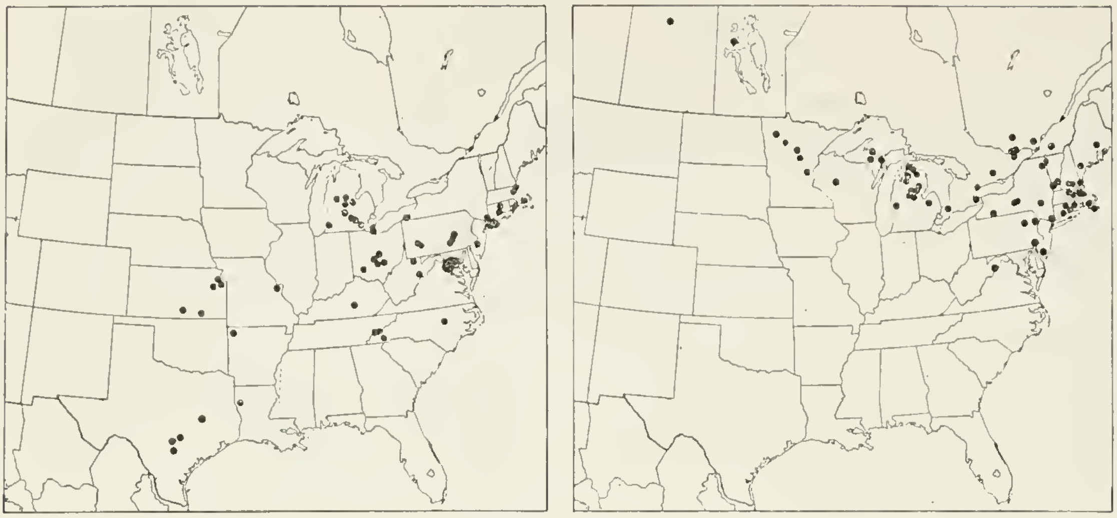
Most collection dates are from May 26 to July 12. Those outside of this range are: April 10 at Jewett, Tex.; April 21 at Frierson, La.; May 12 at Baldwin, Ark.; May 23 at Dixie Landing, Va.; May 24 at Takoma Park, Md.; July 13 at Beach Bluff, Mass., and in Gratiot Co., Mich.; July 14 in Mecosta Co., Mich.; and July 21 on East Sister Island, Ont., and at Put-in-Bay on South Bass Island, Ohio.

This species occurs in the Carolinian fauna.

14. Trychosis kathrynae, new species

FIGURE 394

Front wing 5.2 to 7.8 mm. long; clypeus moderately large, evenly convex, its apical margin moderately arcuate; temple flat, weakly concave, or faintly convex, rarely with a moderate convexity, next to occipital carina always faintly convex; cheek rather long, with moderately coarse punctures that are separated by about 0.4 their diameter; lateral portion of occipital carina produced as a lamella of variable height, subventrally usually about as wide as third segment of maxillary palpus; second segment of flagellum about 2.35 as long as wide in male, about 2.7 as long as wide in female; thorax moderately long; notaulus absent or indistinct; punctures on mesopleurum moderately coarse, on its median portion separated by about 0.6 their diameter, on its ventral portion somewhat crowded; propodeum of moderate



Figures 198, 199.—Localities: 198 (left), *Trychosis exulans;* 199 (right), *T. kathrynae.*

length, its apical carina forming rudimentary sublateral crests, mesad of the crests curving gently forward, its median portion usually absent; hind femur about 5.6 as long as deep in male, about 4.85 as long as deep in female; hind tarsus of female exceptionally stout, its spinelike bristles unusually conspicuous; sides of areolet faintly to distinctly convergent; nervulus beyond basal vein by about 0.18 its length; nervellus broken near its middle; petiole rather smooth and rounded except that its lateral face is flattened or weakly concave; second tergite subpolished, its hair sockets separated by about 0.8 the length of the hairs; ovipositor normal for the genus.

Male: Black. Palpi dark brown, the last three segments of maxillary palpus pale brown and the apex of segment 2 and most or all of segments 3 and 4 usually whitish or stramineous; second trochanters mostly brown; front femur pale brown, dark brown basally and behind; middle femur dark brown, its apex and a stripe in front pale brown; front and middle tibiae fulvous; front and middle tarsi pale fulvous, their fifth segments brown, and median three segments of middle tarsus usually more or less whitish; base and apex of hind femur narrowly ferruginous; segment 1 of hind tarsus dark brown, its apical 0 to 0.8 white, usually its apical 0.65± white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus brown, often white basally; wings faintly tinged with fuscous; apical 0.35± of first tergite and all of tergites 2–5 ferruginous, the apex of tergite 5 sometimes infuscate.

Female: Black. Palpi fuscous; flagellum blackish brown, the apex of the basal segments a little paler, the flagellum nearly always with a median incomplete whitish band that covers about 4 segments; front and middle femora dark brown, their apices paler; front and middle tibiae and tarsi medium brown, the fifth segments of their tarsi darker; hind tarsus dark brown, its middle three segments often paler, rarely whitish; wings tinged with fuscous; abdomen ferruginous, the basal 0.65 ± of its first segment and all or part of its last two tergites blackish.

The female is easy to recognize by its short thick flagellar segments, flat temple, and thick hind tarsus. Recognition of the male is dependent on the combination of characters used in the key.

The species name is for Mrs. Kathryn Dreisbach, cocollector with her husband of a wealth of ichneumonid specimens used in this and other papers.

Type: ♂, Gladwin Co., Mich., July 25, 1957, R. and K. Dreisbach (Dreisbach).

Paratypes (62♂, 39♀): From Connecticut (East Hartford, Green Falls, Lyme, and New Haven); Maine (Casco, Old Town, and Salsbury Cove); Manitoba (Cedar Lake); Massachusetts (Blue Hills Reservation, Forest Hills, Milton, Muskeget Island, Petersham, Rutland, and Woods Hole); Michigan (Cheboygan Co., Clare Co., Delta Co., Dickinson Co., Douglas Lake, Gladwin Co., Huron Mts., Isabella Co., Kalkaska Co., Midland Co., Montmorency Co., Muskegon Co., Ogemaw Co., Thumb Lake in Charlevoix Co., and Tuscola Co.); Minnesota (Cass Co., Garrison, Grandy, Itasca Park, and Plummer); New Hampshire (Durham, Jaffrey, and Mount Monadnock); New Jersey (Dividing Creek); New York (Allegany State Park, Ithaca, Maple Crest in Catskill Mts., New Russia in Essex Co., Six Mile Creek in Ithaca, and Westchester Co.); Ontario (Beamsville, Harold, Ottawa, Strathroy, and Toronto); Pennsylvania (Delaware Co., Pike Co., and Spring Brook); Quebec (Fulford, Gracefield, Hull, Queen's Park in Aylmer, and St. Esprit); Saskatchewan (Prince Albert National Park); Vermont (Ascutney, Grand Isle, and West Rupert); West Virginia (Lost River State Park in Hardy Co.); and Wisconsin (Worden Township in Clark Co.).

Most collection dates are from June 15 to August 19. Those outside of this range are: May 20 at Spring Brook, Pa.; May 30 at Milton, Mass.; June 5 at New Haven, Conn.; June 7 to 11 in Tuscola Co., Mich.; June 10 at Mount Monadnock, N.H.; June 12 in Delaware Co., Pa.; August 21 at St. Esprit, Que.; August 22 to 31 in Lost River State Park, Hardy Co., W. Va.; August 26 at Aylmer, Que., and in Dickinson Co., Mich.; and September 5 at East Hartford, Conn.

There are two reared specimens: ♂, reared from cocoon, Plummer, Minn., collected Oct. 19, 1931, emerged January 1932, Donald Denning. ♀, reared from cocoon found under rock, Ithaca, N.Y., collected Apr. 29, 1917, emerged May 10, R. C. Shannon.

This species occurs in the Alleghanian fauna.

15. Trychosis subgracilis (Cresson)

FIGURE 395

Cryptus subgracilis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 303; ♀. Type: ♀, Illinois (Philadelphia).

Cryptus rufoannulatus Provancher, 1874, Naturaliste Canadien, vol. 6, p. 177, 202; ♂, ♀. Lectotype: ♀, Quebec (Quebec).

Front wing 3.2 to 7.0 mm. long; clypeus rather small, strongly convex, its lower half rather abruptly declivous to the apical margin, the apical margin rather strongly arcuate; temple flat to weakly convex; cheek long, its punctures moderately large and moderately strong, separated by about 0.4 their diameter; lateral portion of occipital carina raised as a low lamella that ventrally is about 0.5 to 0.8 as high as width of third segment of maxillary palpus; second flagellar segment of male about 2.3 as long as wide, of female about 4.0 as long as wide; thorax moderately long; horizontal part of epomia very strong, its vertical portion weak or obsolescent; notaulus absent; punctures on mesopleurum very coarse and strong, separated by about 0.4 their diameter; propodeum of moderate length, its apical carina forming faint sublateral crests, mesad of the crests sharply curved forward, its median portion lacking; hind femur about 5.7 as long as deep in male, about 6.0 as long as deep in female; sides of areolet parallel; nervulus beyond basal vein by about 0.25 its length; nervellus broken near its middle; petiole of moderate length, with a weak dorsolateral and ventrolateral longitudinal ridge, its lateral face with weak wrinkling; second tergite polished or subpolished, its hair sockets separated by about 0.65 the length of the hairs; ovipositor normal for the genus.

Male: Black. Maxillary palpus with first segment and basal half of second dark brown, apical half of second and all of third and fourth segments yellowish white, and last segment light or medium brown; labial palpus dark brown; tegula blackish brown; front femur pale brown, dark brown basally and behind; middle femur dark brown, its apex and a stripe in front pale brown; front tibia fulvous to medium brown, white above; middle tibia light to dark brown, white above; front and middle tarsi brownish fulvous, more or less of their upper sides yellowish white, their fifth segments brown; hind tarsus blackish brown, the third and fourth segments often partly or entirely pale brown or whitish; apical half or less of second segment of hind tarsus sometimes whitish; wings with a fuscous tinge; abdomen entirely ferruginous.

Female: Black, sometimes the black with a ferruginous tinge. Flagellum blackish brown, paler below; palpi and tegula blackish brown; front femur pale brown, dark brown basally and behind; middle femur dark brown, its apex and the apical part of front side pale brown; front and middle tibiae and tarsi pale brown to medium brown; hind tarsus blackish brown, a little paler at the joints; wings weakly infuscate; abdomen entirely ferruginous.

The male is distinguishable by the upper side of the front and middle tibiae being white and hind femur and basitarsus black. The female has a narrow clypeus, rather flat temple, notaulus absent or indistinct, hind femur black, and no white at middle of flagellum or sometimes a very little white. See the key for further female characters.

Specimens (76♂, 113♀): From Colorado; Connecticut (East Hartford and South Meriden); Florida (Daytona and Larkins in Dade Co.); Indiana (Morgan Co.); Iowa (Ames); Kentucky (Louisville); Maine (Salsbury Cove); Maryland (Takoma Park); Massachusetts (Amherst, Brookline, Holliston, Lexington, Nantucket, Petersham, and Woods Hole); Michigan (Ann Arbor, Arenac Co., Bangor, Bay Co., Cheboygan, Douglas Lake, East Lansing, George Reserve in Livingston Co., Midland Co., Montcalm Co., Otsego Co., Owosso, and South Haven); New Hampshire (Hampton and Lake of the Clouds on Mount Washington); New Jersey (Freehold, Jamesburg, Manasquan, Moorestown, and Ramsey); New York (Babylon, Bemus Point, Cold Spring Harbor, Farmingdale, Flatbush, Ludlowville, Mount Marcy at 5,344 ft., New Rochelle, Orient, Oswego, Potter Swamp in Yates Co., Rochester Junction, and Six Mile Creek near Ithaca); North Carolina (Balsam, summit of Black Mts., and Mount Mitchell at 5,200 ft.); Ohio (Alum Creek in Columbus, Cleveland, Dayton, Delaware Co., Hocking Co., Put-in-Bay on South Bass Island, Scioto Co., and Union Co.); Ontario (Elsinore in Bruce Co., Grand Bend, Ottawa, and Vineland Station); Pennsylvania (Arendtsville, Paupack, and Philadelphia); Prince Edward Island (Dalvay House in Canadian National Park); Quebec (Hemmingford); Rhode Island (Buttonwoods and Westerly); Tennessee (Gatlinburg at 6,600 ft.); Texas (Mineral Wells); Vermont (Rutland); Virginia (Chain Bridge, Dixie Landing, Dunn Loring, Falls Church, and Vienna); West Virginia (Rockport); and Wisconsin (Gays Mills, Milwaukee, and Sturgeon Bay).

Most collection dates are in June and July. Those outside of these two months are: April 8 at Daytona, Fla.; May 9 at Falls Church, Va.; May 12 at Vienna, Va.; May 20 in Hocking Co., Ohio, and in Montcalm Co., Mich.; May 21 at Babylon, N.Y.; May 21 and 27 at Dixie Landing, Va.; August 1 to 15 at Rutland, Vt.; August 4 at Ann Arbor, Mich., and at Dalvay House, Canadian National Park, P.E.I.; August 6 at Elsinore, Ont.; August 13 at Potters Swamp, Yates Co., N.Y.; August 20 at 5,200 ft. on Mount Mitchell, N.C.; and August 24 at Lake of the Clouds, Mount Washington, N.H.

There is one reared specimen: ♀, reared from head of *Rudbeckia amplex*, Mineral Wells, Tex., June 9, 1908, C. R. Jones.

This species occurs in the United States and southern Canada, mostly east of 100° west longitude.

16. Trychosis depilis, new species

FIGURE 396

Front wing 4.8 to 7.5 mm. long; clypeus rather small, strongly convex, its lower half rather abruptly declivous to the apical margin, the apical margin rather strongly arcuate; cheek long, its punctures moderately coarse, separated by about 0.5 their diameter; temple weakly convex, rather long; occipital carina strong, sharp, and rather high, near hypostomal carina sometimes raised as a lamella that may be as high as the width of third segment of maxillary palpus; second segment of flagellum about 2.4 as long as wide in male, about 2.75 as long as wide in female; horizontal portion of epomia moderately strong but its vertical portion incomplete or very weak, present only above; punctures of mesopleurum moderately coarse, strong, separated by about 0.4 their diameter; propodeum of moderate length, its apical carina forming weak sublateral crests, mesad of the crests slanted forward, the median portion of apical carina usually absent; hind femur about 5.2 as long as deep in male, about 4.8 as long as deep in female; intercubiti weakly convergent; nervulus beyond basal vein by about 0.25 its length; nervellus broken near its middle; petiole moderately slender, usually with weak to moderately strong ventrolateral and dorsolateral longitudinal ridges, its lateral face usually with weak, irregular wrinkles in male, smooth or almost smooth in female; second tergite polished, the hairs on its median portion moderately dense to sparse in male, sparse to very sparse in female; ovipositor normal for the genus.

Male: Black. Palpi brown; tegula black; second trochanters ferruginous to black; front and middle legs beyond trochanters ferruginous, their femora often more or less fuscous basally and behind, their fifth tarsal segments dark brown; hind femur ferruginous or sometimes more or less infuscate; hind tibia varying from ferruginous with its apex infuscate to entirely fuscous; hind tarsus brown, ferruginous brown at the joints; wings moderately infuscate; abdomen ferruginous, the basal 0.7± of its first segment black and its apex fuscous or infuscate, the infuscation beginning variously beyond the fifth, sixth, or seventh tergites.

Female: Colored like the male except that coxae and trochanters often have a ferruginous tinge and rarely are mostly ferruginous, wings average a little darker, first abdominal segment is entirely ferruginous except often for some basal infuscation, and apex of abdomen is not blackish except for sometimes a little infuscation on last one or two tergites.

This species is close to *T. reflexa* and shows some tendency to intergrade with it. It may be only subspecifically distinct.

Type: ♀, Corvallis, Oreg., July 7, 1925, H. A. Scullen (Washington, USNM 63811).

Paratypes (19♂, 40♀): From British Columbia (Nanaimo Biological Station, Osoyoos, Steelhead, and Waldies Road near Robson at 2,000 to 3,200 ft.); California (Big Pine Creek in Inyo Co. at 7,500 ft., Bridge Creek Camp in Lassen Co., Lake Henshaw in San Diego Co., Palo Alto, Potwisha in Sequoia National Park at 2,000 to 3,000 ft., 4 miles west of Quincy, San Gabriel Canyon, Susan River Camp in Lassen Co., Silver Lake in Mono Co., Tioga Pass, Walker Pass in Kern Co., and Woodlake); Idaho (Moscow at 2,560 ft.); Oregon (Coburg, Corvallis, Hart Mt. at 6,500 ft., Mount Angel, North Powder Lakes, Salem, Talent, and 5 miles south of The Dalles); Utah (Wellsville Mts. in Cache Co.); Washington (Carters Point on San Juan Island, "Cranberry Station," Ilwaco, and San Juan Island); and Wyoming (Lower Falls at Continental Divide in Yellowstone Park).

Most collection dates are in June, July, and the first half of August. Records outside of this range are: March 15 at Woodlake, Tulare Co., Calif.; March 25 at Palo Alto, Calif.; March 30 in San Gabriel Canyon, Calif.; April 10 at Lake Henshaw, San Diego Co., Calif.; April 26 at Walker Pass, Kern Co., Calif.; May 3, 14, and 16 at Corvallis, Oreg.; May 25 at Potwisha, 2,000 to 3,000 ft., Sequoia National Park, Calif.; August 16 at Silver Lake, Mono Co., Calif.; August 20 at North Powder Lakes, Oreg.; and August 23 and September 22 on San Juan Island, Wash.

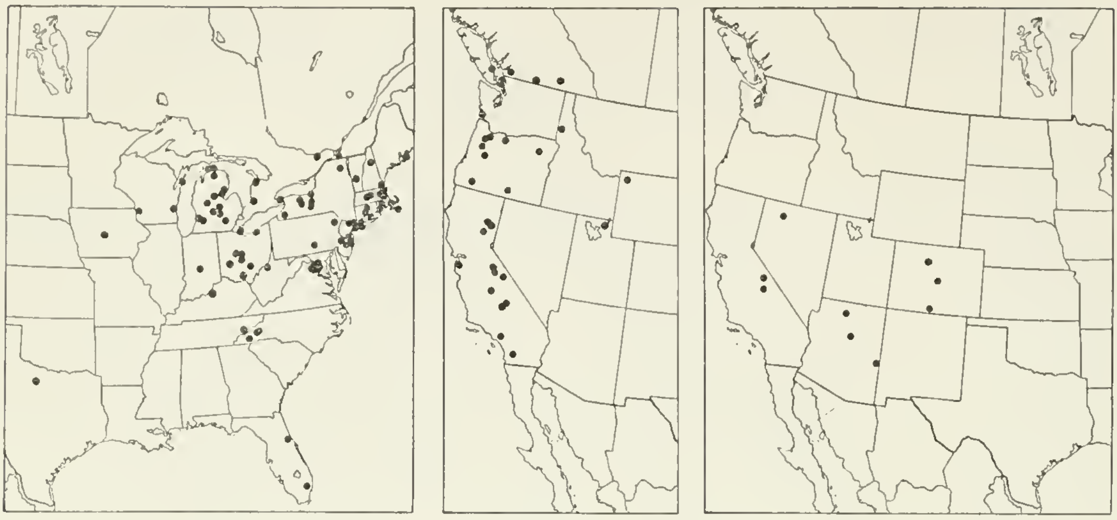
Five different collections are labeled as from flowers of *Daucus*, three of them on *D. pusillus* and two on *D. carota*.

This species occurs from southern British Columbia to southern California and eastward to Yellowstone Park, Wyoming.

17. Trychosis atrorubens, new species

FIGURE 397

Front wing 5.2 to 8.0 mm. long; clypeus rather small, strongly convex, its apical margin strongly arcuate; cheek long, mat, its punctures of moderate size, rather weak, separated by about 0.7 their diameter and somewhat obscured by horizontal wrinkling; temple at its upper 0.3 faintly convex or flat; lateral and ventral portions of occipital carina raised as a lamella, the lamella ventrally about 1.7 as high as width of third segment of maxilla; second segment of flagellum about 2.4 as long as wide in male, about 3.1 as long as wide in female; horizontal portion of epomia moderately strong, laterally bent ventrad but the vertical portion absent or very weak; notaulus absent; punctures on mesopleurum moderately coarse, separated by about 0.3



FIGURES 200–202.—Localities: 200 (left), *Trychosis subgracilis;* 201 (center), *T. depilis;* 202 (right), *T. atrorubens.*

their diameter; propodeum of moderate length, its apical carina forming broad rudimentary sublateral crests, mesad of the crests curved forward, its median portion very weak or sometimes absent; hind femur of male about 5.9 as long as deep, of female about 5.6 as long as deep; sides of areolet parallel or faintly convergent; nervulus beyond basal vein by about 0.33 its length; nervellus broken near its middle; petiole rather slender, with a ventrolateral and dorsolateral longitudinal ridge, its lateral face with some weak wrinkling; second tergite subpolished, its hairs a little denser laterally than medially, the hair sockets separated by about 0.8 the length of the hairs in male, in female the sockets almost as closely spaced but because the hairs are shorter they are separated by about 1.0 to 1.4 the length of the hairs; ovipositor normal for the genus.

Male: Black. Palpi blackish brown; tegula black; front femur light brown, fuscous basally and behind; middle femur blackish, its front side rather light brown, at least toward the apex; front and middle tibiae dark brown, medium brown in front; front and middle tarsi dark brown, paler at the joints; hind tarsus black, most or all of segments 3 and 4 usually white, and some or all of segment 2 often white; wings infuscate; apical 0.18 of first abdominal segment and all of the following segments ferruginous.

Female: Colored like the male except that hind tarsus is always blackish brown with the joints paler. The flagellum is entirely black.

The fuscous wings, black hind femur, vertical part of epomia weak or absent, flat or weakly convex temple, and very high, lamellalike occipital carina distinguish this species. It is very close to *T. reflexa,* which is most easily distinguished by the strong vertical portion of the epomia.

Type: ♀, near Alpine, Ariz., May 28, 1947, H. and M. Townes (Washington, USNM 63812).

Paratypes: ♂, 2♀, near Alpine, Ariz., May 28 and 29, 1947, H. and M. Townes (Townes). ♂, north rim of Grand Canyon, 8,000 ft., Ariz., June 1, 1946, R. M. Bohart (Townes). 2♂, Oak Creek Canyon, Ariz., May 16 and 17, 1947, H. and M. Townes (Townes). ♂, Bigpine Creek, Inyo Co., Calif., June 17, 1942, R. Bohart (Townes). ♂, Lone Pine, Inyo Co., Calif., June 18, 1937, N. W. Frazier (Berkeley). ♂, Los Pinos, Conejos Co., Colo., May 30, 1899, Carl F. Baker (Washington). ♀, Manitou, Colo., June 23, 1926, E. C. Van Dyke (San Francisco). ♂, near Ward, Colo., June 2–9, 1933, H. G. and H. E. Rodeck (St. Paul). ♂, Winnemucca, Nev., May 31, 1958, T. R. Haig (Davis).

This species ranges from central Colorado to Inyo Co., California.

18. Trychosis reflexa, new species

FIGURE 398

Front wing 5.0 to 7.8 mm. long; clypeus rather small, strongly convex, its lower 0.4 rather abruptly declivous to the apical margin; temple at its upper 0.3 faintly to moderately concave, or sometimes flat; both vertical and horizontal portions of epomia strong, the entire epomia making a full half circle extending from near midline to ventral edge of pronotum (epomia weaker or not making a full half circle in the other Nearctic species); second tergite of female with hairs very sparse medially, moderately dense laterally. Structure otherwise as described for *T. atrorubens.*

Male: Black. Maxillary palpus dark brown, the apex of second segment and all of third and following segments usually stramineous; labial palpus blackish; tegula black; front and middle femora usually entirely ferruginous but sometimes more or less infuscate; hind femur usually ferruginous but sometimes fuscoferruginous or black; front and middle tibiae and tarsi ferruginous, sometimes largely infuscate, the fifth tarsal segments always dark brown; hind tibia usually dusky ferruginous, sometimes blackish brown or black; hind tarsus usually dusky ferruginous, sometimes blackish, its second through fourth segments entirely ivory, or the basal part of second segment sometimes more or less infuscate; wings infuscate; abdomen entirely ferruginous or the basal 0.8± of the first segment blackish; eighth tergite and genitalia of male often a little darkened or infuscate.

Female: Colored like the male except that maxillary palpus is entirely dark and that the hind tarsus is brown with the second through fourth segments usually a little paler or rarely yellowish. The flagellum lacks a median white band.

This is very close to *T. atrorubens* and is likely to prove a subspecies of it. It is usually easy to distinguish because the hind femur is usually ferruginous in *reflexa* and always black in *atrorubens*. Most specimens from Utah, Idaho, and Montana, however, have about the same coloration as *T. atrorubens*, and may be distinguished only by the strong vertical portion of the epomia and by the fact that the temple is usually slightly concave.

The strong and complete epomia, fuscous wings, lamellalike occipital carina, and the concave or flat temple distinguish the species.

Type: ♀, Camino, Calif., June 30, 1948, H., M., G., and D. Townes (Washington, USNM 63813).

Paratypes (157♂, 48♀): From British Columbia (Lillooet, Oliver, Osoyoos, Robson, and Victoria); California (Antioch, Arroyo Seco Camp in Monterey Co., Artois in Glenn Co., Ash Mt. in Sequoia National Park, 8 miles west of Atascadero in San Luis Obispo Co., Bass Lake in Madera Co., Ben Lomond in Santa Cruz Co., Berkeley, Big Dalton Dam in Los Angeles Co., Bigpine Creek in Inyo Co. at 7,500 ft., Bolinas Beach, Bradley in Monterey Co., Brentwood in Contra Costa Co., Camp Baldy in San Bernardino Co., Carmel, Carrville in Trinity Co. at 2,400 to 2,500 ft., Chile Bar in El Dorado Co., near Coalinga, Crystal Lake Road in Los Angles Co. at 4,700 ft., Davis, Davis Creek in Modoc Co., Fallen Leaf Lake in El Dorado Co., Firebaugh in Fresno Co., Fish Camp, Fort Seward, Fruto in Glenn Co., Galt in Sacramento Co., Glendale, Hallelujah Junction in Lassen Co., Hastings Natural History Reserve near Jamesburg in Santa Lucia Mts. in Monterey Co. at 1,900 to 2,700 ft., Hemet Reservoir in San Jacinto Mts., Herkey Creek in San Jacinto Mts., Howland Flat in Sierra Co., 6 miles south of Idria in San Benito Co., Idyllwild in San Jacinto Mts., Kinocti Bay on Clear Lake, Kyburz in El Dorado Co., Lake Forest near Lake Tahoe, Leland Meadow in Tuolumne Co., Lone Pine in Inyo Co., Loomis, Los Gatos Canyon divide to Diablo Range in Fresno Co., Mesa Grande in Sonoma Co., Miami Ranger Station in Mariposa Co., Mill Valley, Mokelumne Hill, Mount Diablo, Mount Hamilton in Santa Clara Co., Napa, Navarro River in Mendocino Co., hills back of Oakland, Oakley in Contra Costa Co., 3 miles southwest of Orland in Glenn Co., Pacific Grove, Pinnacles in San Benito Co., near Pinoche [=Panoche] in Fresno Co., 4 miles west of Plantation in Sonoma Co., Poso Creek in Kern Co., 4 miles west of Quincy in Plumas Co., Ramona Ranger Station in San Diego Co., Redding, Round Valley in Inyo Co., Russelmann Park on Mount Diablo, Sacramento, Samuel Springs in Napa Co., San Antonio Ranger Station in Santa Clara Co., San Antonio Valley in Santa Clara Co., San Francisco, San Luis Rey Camp in San Diego Co., Santa Cruz Island, 6 miles northeast of Santa Margarita in San Luis Obispo Co., Seeley, Sierraville in Sierra Co., Sisson, Snowline Camp near Camino in El Dorado Co., Sobre Vista in Sonoma Co., Sonoma in Sonoma Co., South Pasadena, Stanford University, Tanbark Flat in Los Angeles Co., Tolay Creek in Sonoma Co., Trinity Co., Walnut Creek, Warner Springs in San Diego Co., Watts Valley in Fresno Co., Woodlake in Tulare Co., Woodland, Yosemite at 3,880 to 4,000 ft., and Yucca Creek in Sequoia National Park); Idaho (Bear Pass Creek in Butte Co., Lewiston, Moscow, and Moscow Mt.); Montana (Helena); Nevada (Verdi); Oregon (Blooming, Corvallis, Klamath Falls, 5 miles west of Lewisburg in Benton Co., Union Creek in Jackson Co., Phoenix, and The Dalles); South Dakota (2 miles south of Custer in the Black Hills); Utah (Benson, City Creek Canyon in Salt Lake Co., Lehi, Mill Creek Canyon in Salt Lake Co., Newton, Providence, Salt Lake City, Tremonton, Utah Lake at Provo, and Wellsville Mts. in Cache Co.); and Washington (Colfax, Dartford, Fishtrap Lake in Lincoln Co., Grand Coulee on Columbia River, Husum, Pullman, Toppenish, Uniontown, and Yakima).

Collection dates are mostly in May, June, and July. Those outside of these three months are: March 24 at Lone Pine, Inyo Co., Calif.; April 19 at Walnut Creek, Calif.; August 1 at Galt, Calif., and at Toppenish, Wash.; August 4 and 23 at Moscow Mt., Idaho; August 8 at Helena, Mont.; August 9 at Oakley, Contra Costa Co., Calif.; August 14 at Firebaugh, Fresno Co., Calif.; and September 1 to 15 at Union Creek, Jackson Co., Oreg.

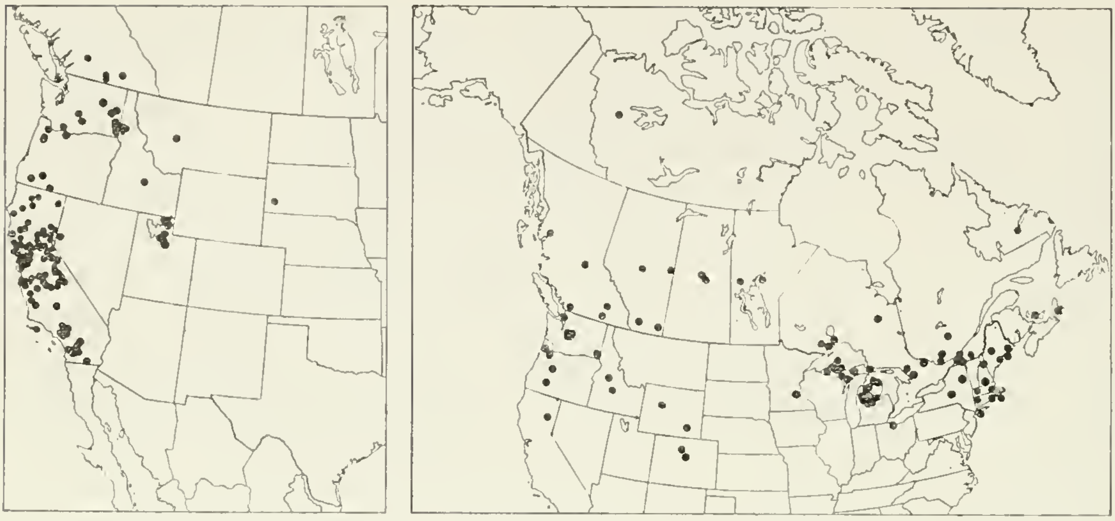
There is one reared specimen: ♀, from cocoons of white fir sawfly, Howland Flat, Calif., July 1953, R. L. Lyons and G. R. Struble. Three lots of specimens were collected on *Pastinaca sativa*, one on *Foeniculum vulgare*, and one on *Eriodictyon* sp.

This species occurs abundantly from southern British Columbia to southern California and sparingly eastward to the Black Hills of South Dakota.

19. Trychosis cyperia, new species

FIGURE 399

Front wing 5.3 to 8.5 mm. long; clypeus rather small, moderately convex, its apical margin weakly arcuate or subtruncate; cheek moderately long, mat, its punctures of moderate size, very close; temple weakly convex, closely punctate; lateral and ventral portions of occipital carina raised as a narrow lamella, near its lower end the lamella about as high as width of third segment of maxillary palpus; second segment of flagellum about 2.8 as long as wide in male, about 4.3 as long as wide in female; prepectus with a short vertical carina opposite lower corner of pronotum that is raised as a crescentic ridge, much higher at middle than at ends (this ridge not raised at the middle in any other Nearctic species except *T. anagmus*); notaulus weak, about



Figures 203, 204.—Localities: 203 (left), *Trychosis reflexa;* 204 (right), *T. cyperia.*

0.25 as long as mesoscutum; punctures on mesopleurum of moderate size, separated by about 0.25 their diameter; propodeum unusually long, its basal and apical carinae unusually far apart, its apical carina rather evenly curved but the median portion bowed forward, the carina strong sublaterally and weak or obsolete medially; hind femur about 5.3 as long as deep in both sexes; sides of areolet parallel; nervulus beyond basal vein by about 0.38 its length; nervellus broken near its upper 0.45; first tergite moderately short, with a strong dorsolateral and a weaker ventrolateral longitudinal ridge (the ridges often obsolete in female), its lateral face almost smooth in female, in male with some indistinct irregular wrinkles, or sometimes the wrinkles stronger and with a vertical direction; second tergite subpolished, its punctures separated by about 0.8 the length of the hairs; ovipositor a little more slender and its point a little shorter than usual for the genus; shaft of lower valve of ovipositor with faint, irregularly vertical wrinkling (entirely or mostly smooth in all other Nearctic species except *T. anagmus*).

Black. Palpi dark brown; tegula black; femora entirely fulvoferruginous or sometimes more or less infuscate; front and middle tibiae fulvous; front and middle tarsi fulvous, their fifth segments brown, often the other segments a little infuscate, and often the median segments partly pale fulvous or pale yellow; hind tibia varying from ferruginous with the apex darkened to entirely dark brown; hind basitarsus reddish brown, its apical 0.6± yellowish white; segments 2–4 of hind tarsus yellowish white; segment 5 of hind tarsus brown, its base paler; wings tinged with brown; first segment of abdomen entirely ferruginous or basally infuscate, or its basal 0.7± blackish; tergites 2 and 3 ferruginous; tergite 4 entirely black, or in male usually largely ferruginous but with some fuscous apically.

This species and *T. anagmus* are the two Nearctic representatives of a Holarctic species group which is characterized primarily by the crescentic elevation of the vertical carina on prepectus opposite lower corner of pronotum and the wrinkled lower valve of ovipositor. Secondary characteristics of the group are: General shape of head and clypeus as illustrated in figures 399 and 400; long propodeum with rather widely separated basal and apical carinae; rather evenly curved apical carina of propodeum; nervulus about 0.38 its length beyond basal vein; and nervellus broken usually above the middle. Eurasian representatives of the group are *T. glabricula* (Thomson) 1873, and an undescribed species from Japan. These two are close to the Nearctic *T. cyperia* and *T. anagmus*, respectively. One or both of them may prove to be only subspecifically distinct from the Nearctic forms to which they are related.

The species *cyperia* is distinguished by the median elevation of the short vertical carina on prepectus that is opposite lower corner of pronotum, segments 2–4 of hind tarsus yellowish, and tergite 4 partly or entirely fuscous.

Type: ♀, on coarse sedges in a wet meadow, Huron Mts., Marquette Co., Mich., July 19, 1959, H. Townes (Washington, USNM 63814).

Paratypes (19♂, 115♀): From Alberta (Cold Lake, Cypress Hills, Edmonton, and Oldman River near Lethbridge); British Columbia (Kaslo, Kleanza Creek near Terrace, Likely, Robson, "Steamboat Mt.," and Steelhead); California (Bridge Creek Camp in Lassen Co.); Colorado (Chimney Gulch and near Estes Park); Connecticut (Salisbury); Idaho (10 miles north of Leslie near Bear Creek Camp and Panther Creek 10 miles southwest of Leesburg in Lemhi Co.); Labrador (Goose Bay); Maine (Bar Harbor, Capens, Lincoln Co., and Machias); Manitoba (Norway House and Wanless); Massachusetts (Greylock Mt., Holliston, and Martha's Vineyard); Michigan (Alger Co., Alston, Cheboygan Co., Clare Co., Delta Co., Dickinson Co., Huron Mts., Kalkaska Co., Keweenaw Co., Mecosta Co., Midland Co., Missaukee Co., Ogemaw Co., Ontonagon Co., Osceola Co., Otsego Co., Presque Isle Co., Rudyard, Wexford Co., and Yellow Dog Plains in Marquette Co.); Minnesota (Hennepin Co.); New Hampshire (Jaffrey and summit of Mount Washington); New York (Boreas River in Essex Co., Hinckley, and Long Beach); Northwest Territories (Norman Wells); Nova Scotia (Baddeck); Ohio (Lakeside); Ontario (Bigwood on French River, near Chalk River in Petawawa National Forest, Hymers, Nipigon, Orrville, Smoky Falls on Mattagami River, and Thunder Bay Beach); Oregon (Blooming, Diamond Lake, Pamelia Lake on Mount Jefferson at 3,000 ft., and Seaside); Prince Edward Island (Brackley Beach in Canadian National Park); Quebec (Hemmingford, La Trappe, Meach Lake, Montigny, Rigaud, Sweetsburg, and

Wakefield); Rhode Island (Westerly); Saskatchewan (Prince Albert National Park and Waskesiu Lake); Washington (Blue Mt., Coupeville, Longmire in Mount Rainier National Park, Mount Rainier at 2,900, 3,500, 4,200, and 4,700 ft., Snoqualmie Pass, and Summerland Trail on Mount Rainier); and Wyoming (Laramie and Shoshone National Forest).

Most collection dates are from June 11 to August 12. Those outside of this range are: May 19 at Hymers, Ont.; May 24 at Baddeck, N.S.; June 4 at Jaffrey, N.H., and at Rudyard, Mich.; June 8 on Martha's Vineyard, Mass.; June 9 at Likely, B.C.; August 18 to 22 in Midland Co., Mich.; August 22 in Keweenaw Co., Mich.; August 23 in Kalkaska Co., Mich.; and August 27 in Ontonagon Co., Mich.

One male specimen was reared from a cone of white spruce at Cold Lake, Alta., emerging January 21, 1952. The typical habitat of the species is damp meadows with coarse sedges.

This species is transcontinental, mostly in the Canadian and Hudsonian zones.

20. Trychosis anagmus, new species

FIGURE 400

Front wing 4.6 to 6.5 mm. long; clypeus small, very strongly convex, its apical margin arcuate; cheek moderately long, its punctures rather small and weak, separated by about 0.8 their diameter; temple weakly convex; ventral portion of occipital carina elevated as a low lamella that is about 0.8 as high as width of third segment of maxillary palpus; second segment of flagellum about 2.8 as long as wide in male, about 4.1 as long as wide in female; prepectus with a short vertical carina opposite lower corner of pronotum that is raised as a crescentic ridge, much higher at middle than at ends (this ridge not raised at the middle in any other Nearctic species except *T. cyperia*); notaulus absent;

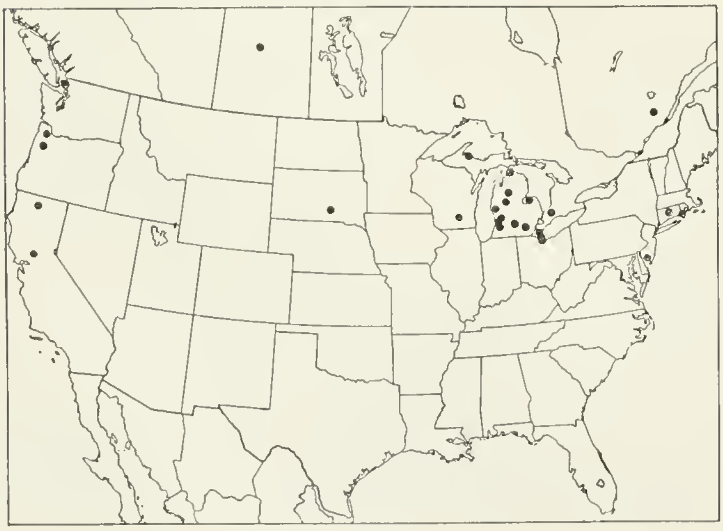


FIGURE 205.—Localities for *Trychosis anagmus.*

punctures on mesopleurum of moderate size, somewhat crowded; propodeum unusually long, its basal and apical carinae unusually far apart, its apical carina rather evenly curved but the median portion bowed forward, the carina stronger sublaterally and weak or obsolete medially; hind femur about 4.6 as long as deep in male, about 5.1 as long as deep in female; areolet rather long, its sides parallel; nervulus beyond basal vein by about 0.38 its length; nervellus broken near its upper 0.37; petiole short, with dorsolateral and ventrolateral longitudinal carinae which are moderately strong in male and weak in female, its lateral face with distinct vertical wrinkling; second tergite subpolished, its hairs unusually dense, the hair sockets separated by about 0.6 the length of the hairs; ovipositor a little more slender and its point a little shorter than usual; shaft of lower valve of ovipositor with faint, irregular, vertical wrinkling (entirely or mostly smooth in all other Nearctic species except *T. cyperia*).

Black. Palpi fuscous; tegula black; femora ferruginous; front and middle tibiae fulvoferruginous; front tarsus fulvoferruginous, brownish apically; hind tibia ferruginous, infuscate apically; middle and hind tarsi fuscous, the base of their first segments and the joints brownish ferruginous; wings tinged with fuscous; first abdominal segment ferruginous, its basal 0.5± infuscate; tergites 2 and 3 ferruginous; tergite 4 entirely black or black with its base ferruginous.

This species is distinguished by the median elevation of the short vertical carina on prepectus that is opposite lower corner of pronotum, segments 2–4 of hind tarsus fuscous, and tergite 4 largely or entirely black. For a discussion of its relationships, see under *T. cyperia*.

Type: ♀, on coarse sedges in a wet meadow, Huron Mts., Marquette Co., Mich., July 20, 1959, H. Townes (Washington, USNM 63815).

Paratypes (27♂, 21♀): From British Columbia (Lower Post); California (Davis and Sisson); Connecticut (East Hartford); Michigan (Allegan Co., Ann Arbor, Aurelius, Douglas Lake in Cheboygan Co., Grand Junction, Hudsonville, Huron Mts., Lake City, Mecosta Co., Muskegon Co., and Sand Point in Huron Co.); New Jersey (Dividing Creek); Ohio (Lakeside and Put-in-Bay); Ontario (East Sister Island and Strathroy); Oregon (Cornelius and Corvallis); Quebec (Laurentides Park); Rhode Island (Westerly); Saskatchewan (Prince Albert National Park); South Dakota (Chamberlain); Washington (Mount Constitution); and Wisconsin (Madison).

Most collection dates are in July and August. Those outside of this range are: April 10 at Davis, Calif.; May 15 at Cornelius, Oreg.; June 3 in Prince Albert National Park, Sask.; June 20 at Lower Post, B.C.; September 5 at Ann Arbor, Mich.; and September 7 at Davis, Calif.

A series of 2♂, 4♀ taken by us at Ann Arbor, Mich., was from an old field that had overgrown with grass, weeds, and *Crataegus*.

This species is transcontinental in the Transition and Canadian zones.

18. Genus Hemisphragia

FIGURE 317,a

Micromavia Seyrig, 1952, Mém. Acad. Malgache, fasc. 19, p. 204. New synonymy. Type: *Micromavia carinata* Seyrig; original designation.

Hemisphragia Seyrig, 1952, Mém. Acad. Malgache, fasc. 19, p. 207. Type: *Hemisphragia trianguliferus* Seyrig; original designation.

Front wing 3.6 to 5.7 mm. long; body slender; frons unarmed; clypeus moderately large, rather evenly convex, its apical margin broadly, evenly convex or with a broad, faint median lobe; subapical part of female flagellum a little widened, weakly flattened below; mesoscutum rather short, moderately convex, polished or subpolished, its punctures moderately small to fine, separated by about 1.0 to 3.0 their diameter; notaulus sharp, extending to center of mesoscutum or a little beyond; epomia moderately long and strong; propodeum moderately long, rather gently sloping, in profile weakly convex, its spiracle round to elliptic, its transverse carinae complete, the apical carina not forming sublateral crests; areolet rather small, irregularly pentagonal with the apical side shortened, the second intercubital obsolescent; ramellus absent; nervulus opposite basal vein or approximately so; second discoidal cell strongly narrowed basally but not pointed; apical half of mediella very strongly arched; nervellus broken near or below the middle, often near its hind end; brachiella absent (present in all other Nearctic genera normally, but sometimes absent in *Lymeon*); axillus weak, close to anal margin; first tergite long, slender, rather gradually widened apically, terete except that a blunt dorsolateral carina is more or less evident distad of spiracle, without a basolateral tooth, its spiracle near its apical 0.38; second tergite mat to subpolished, its punctures fine and weak to moderately small and moderately sharp, moderately sparse to rather dense; tergite 7 sometimes with a median white spot; ovipositor sheath about 0.42 as long as front wing; ovipositor slender, compressed, its tip elongate sagittate.

This genus contains two species in Madagascar, an undescribed species in China, and one Nearctic species. There are probably more species in Asia and Africa, which more intensive collecting will eventually discover.

1. Hemisphragia debilis, new species

Front wing 3.6 to 4.0 mm. long; general structure as in figure 317,a; mesoscutum polished, with very small and rather sparse punctures;

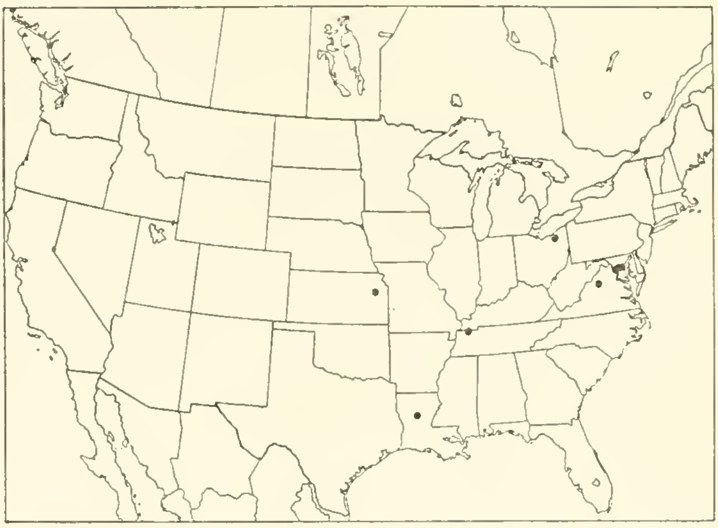


FIGURE 206.—Localities for *Hemisphragia debilis.*

mesopleurum polished, with small punctures that are separated by about 3.0 their diameter, the specular area impunctate; metapleurum polished, with faint, fine wrinkling, its punctures of moderate size, sharp, separated by about 1.5 their diameter.

Black. Clypeus entirely black or its apical half pale brown to dark brown; mouth parts and front and middle coxae and trochanters white or stramineous; scape and pedicel fulvous; female flagellum dark brown, fulvous brown basally below, with a median white, incomplete band that covers about 4.5 segments; collar usually whitish; propleurum rarely fulvous; tegula white; front and middle legs beyond trochanters fulvous, their tarsi brownish apically; hind leg fulvous, its tibia faintly infuscate basally, its tarsus brown, paler at the joints; first five abdominal segments of male dark brown on their basal 0.5±, their apical 0.5± brownish fulvous; tergites 6 and 7 of male entirely dark brown or with fulvous tinges; abdomen of female fulvoferruginous, the basal 0.5± of the segments often more or less brownish.

Type: ♀, Takoma Park, Md., July 13, 1943, H. and M. Townes (Washington, USNM 63816).

Paratypes: ♀, Lawrence, Kans., May 24, 1941, H. K. Townes (Townes). 2♀, Winnfield, La., June 2 and 30, 1918, G. R. Pilate (Ann Arbor). ♀, Bowie, Md., May 30, 1945, H. and M. Townes (Townes). ♀, Takoma Park, Md., June 17, 1942, H. and M. Townes (Townes). ♀, Bedford, Ohio, June 16, 1935, F. D. De Gant (Townes). ♀, in *Quercus-Liriodendron* forest, South Fulton, Tenn., Sept. 15, 1947 (Washington). ♂, Rosslyn, Va., June 8, T. Pergande (Washington). 3♂, Skyline Drive, Va., Aug. 4 and 5, 1945, H. and M. Townes (Townes).

This species occurs in the Carolinian fauna.

19. Genus Diapetimorpha

FIGURE 317,b

Diapetimorpha Viereck, 1913, Proc. U.S. Nat. Mus., vol. 44, p. 564. Type: (*Cryptus armatus* Ashmead) = *introita* (Cresson); original designation.

Front wing 3.4 to 11.5 mm. long; body moderately stout; frons unarmed; clypeus moderately large, rather evenly convex except that it is a little flattened or reflexed near apical margin, its apical margin broadly arcuate with a faint, rounded median point that often is weakly divided into a faint pair of points; mesoscutum moderately convex, mat to polished, its punctures medium sized to very fine, rather dense to separated by about 2.0 their diameter; notaulus sharp, usually reaching to middle of mesoscutum; epomia usually weak; propodeum rather strongly convex, its spiracle round, its basal carina strong and complete, its apical carina in the female forming strong sublateral crests or teeth, elsewhere usually weak or absent; apical carina in the male less strongly modified, usually complete and regular or forming rather weak sublateral crests; areolet small or very small, roughly pentagonal or quadrangular, the second intercubitus absent or vestigial; ramellus absent; nervulus opposite basal vein or approximately so; second discoidal cell moderately narrowed basally; apical half of mediella strongly arched; nervellus broken below the middle; axillus close to anal margin; first abdominal segment moderately long, its spiracle far beyond the middle, rather strongly widened apically, with a lateral subbasal triangular tooth (strong and sharp in female, weaker in male), its dorsolateral and ventrolateral carinae weak or obsolete, its median dorsal carinae absent or in female often present as short, blunt traces on basal part of postpetiole; second tergite mat, with fine, dense punctures and dense, short hairs, especially in female; tergite 7 frequently with a median white spot; ovipositor sheath about 0.50 as long as front wing; ovipositor moderately stout, somewhat compressed, its tip more or less sagittate.

This is a large genus of small or medium sized, mostly bright-colored species. The males are usually differently colored from the females. Eight species are in the southeastern quarter of the Nearctic region. The rest of the genus is Neotropic.

The characteristic habitat of the species is low grassy or weedy vegetation, some species usually in the sun and some in the shade.

Keys to the Nearctic species of Diapetimorpha

MALES

1. Propodeum black and yellow or black and white 2
   Propodeum fulvous or ferruginous, sometimes with indistinct whitish markings 4

2. Tergites 2–6 uniformly fulvous . . . . **5. rufigaster** Cushman

Tergites 2–6 black or infuscate, each with a broad apical white or yellow band 3

3. Metapleurum entirely white . . . . **4. picta,** new species

Metapleurum entirely black . . . . **6. introita** (Cresson)

4. Tyloids well developed, in the form of a sharp carina that extends the full length of several segments; metapleurum with moderately coarse punctures 5

Tyloids obsolescent, difficult to see, in the form of an indistinct short ridge that extends about 0.4 the length of several segments; metapleurum with fine, weak punctures 6

5. Cheek about 0.75 as long as basal width of mandible; clypeus moderately convex; mesosternum usually entirely fulvous, sometimes partly black, rarely entirely black; epomia rather weak . . . . . . **7. acadia** Cushman

Cheek about 0.83 as long as basal width of mandible; clypeus weakly convex; mesosternum largely or entirely black; epomia moderately strong.
8. rugosa, new species

6. Mesoscutum black, with a median pair of white dashes.
3. macula (Cameron)

Mesoscutum mostly or entirely fulvous, with or without a median pair of whitish dashes 7

7. Eye about 75% surrounded with yellowish white, the whitish orbit being interrupted on upper part of temple; mesoscutum without a median pair of whitish dashes . . . . **1. brunnea,** new species

Eye completely surrounded with yellowish white; mesoscutum with a median pair of whitish dashes . . . . **2. alabama** Cushman

FEMALES

1. Metapleurum with strong horizontal wrinkling 2

Metapleurum either not wrinkled or if wrinkled it is in an oblique direction and the thorax is almost or quite uniformly fulvoferruginous 4

2. Thorax brownish ferruginous except that only the collar and propodeal teeth are whitish; fourth tergite fuscous . . . . **1. brunnea,** new species

Thorax fulvous to ferruginous, the scutellum, upper margin of pronotum, a pair of median dashes on mesoscutum, and other markings white; fourth tergite fulvous or ferruginous 3

3. Pronotum and mesoscutum mostly fulvous, with white markings.
2. alabama Cushman

Pronotum and mesoscutum black, with white markings.
3. macula (Cameron)

4. Head and thorax black, or black and white 5

Head and thorax uniformly ferruginous or fulvous 7

5. Head and thorax black, without white markings except that propodeal teeth are whitish; wings fuscous . . . . **6. introita** (Cresson)

Head and thorax black with extensive white markings; wings hyaline . . 6

6. Tergites 2–6 fuscous basally, the rest fulvous and whitish; propodeum basad of its basal transverse carina with two large white spots.
4. picta, new species

Tergites 2–6 uniformly fulvoferruginous; propodeum basad of its basal transverse carina entirely black . . . . **5. rufigaster** Cushman

7. Metapleurum not wrinkled, with close, adjacent, or partly confluent punctures; cheek about 0.75 as long as basal width of mandible.
7. **acadia** Cushman

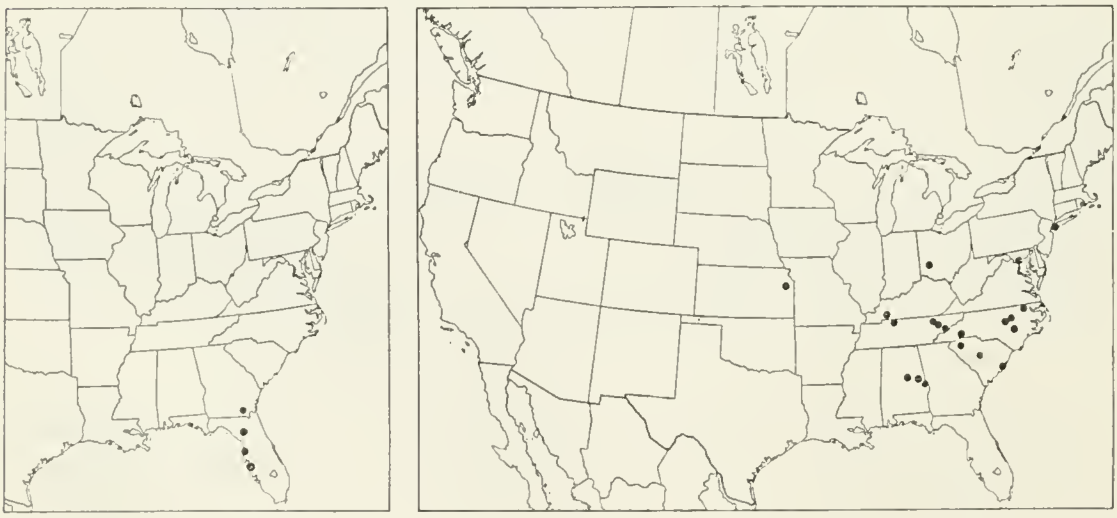
Metapleurum more or less coarsely wrinkled, also closely punctate; cheek about 1.05 as long as basal width of mandible . . . . . 8. **rugosa,** new species

1. Diapetimorpha brunnea, new species

Male: Front wing 3.4 to 4.7 mm. long; clypeus moderately convex; cheek about 0.78 as long as basal width of mandible; tyloids obsolescent, showing as weak ridges about 0.35 as long as the segments; metapleurum with fine, very weak punctures, with a rather distinct juxtacoxal carina; intercubitus about 3.5 as long as the width of radial vein.

Head ferruginous, the face, clypeus, cheek, frontal orbit, and temple except above, white; mandible white; palpi white; scape fulvous; pedicel light brown; flagellum uniformly dark brown; thorax ferruginous, the propleurum, more or less of collar and lower margin of pronotum, subtegular ridge, and more or less of mesosternum, whitish; front and middle coxae and trochanters white; front and middle femora and tibiae pale fulvous, lighter below, darker above; front tarsus stramineous, brown apically; middle tarsus brown, stramineous at the joints; hind coxa, trochanters, and femur fulvous, the trochanters partly white and the femur with a weak apical infuscation; hind tibia light brown, its base a little paler; hind tarsus infuscate, paler at the joints, segments 2–4 and apex of segment 1 often largely or entirely white; wings faintly infuscate; first tergite ferruginous, its apex whitish and often its median part weakly infuscate; second and following tergites ferruginous, their basal 0.4 ± fuscous.

Female: Front wing 4.2 to 5.7 mm. long; clypeus moderately convex; cheek about 0.80 as long as basal width of mandible; metapleurum with strong horizontal wrinkles and interspersed small punctures;



Figures 207, 208.—Localities: 207 (left), *Diapetimorpha brunnea;* 208 (right), *D. alabama.*

apical carina of propodeum complete, forming sharp sublateral teeth; intercubitus about 3.5 as long as the width of radial vein.

Head, mandible, and thorax brownish ferruginous, the collar, subtegular ridge, and propodeal teeth whitish; antenna fulvous brown, a little paler basally, with a white band (incomplete below) that covers about 5.7 segments; palpi stramineous; legs fulvous brown, the hind femur apically and the hind tibia a little darker, the front and middle coxae and first trochanters stramineous; front wing weakly suffused with brown, its base and an indefinite median transverse band paler; hind wing faintly brownish, darker apically; tergites 1 and 2 dark ferruginous, the apical 0.15± of the first tergite whitish and basal 0.4± of second tergite infuscate; tergite 3 varying from dark ferruginous to fuscous; tergites 4–8 fuscous.

Type: ♀, Tarpon Springs, Fla., Mar. 21, 1950, H. Townes (Washington, USNM 63817).

Paratypes: ♀, 2 miles west of Archer, Fla., Mar. 23, 1953, H. F. Howden (Townes). ♀, Oneco, Fla., Mar. 25, 1955, John C. Martin (Ottawa). 4♂, flying low over the ground in deciduous woods, Tarpon Springs, Fla., Mar. 20 and 21, 1950, H. Townes (Townes). ♂, ♀, Okefenokee Swamp, Ga., July 27, 1939, R. H. Beamer (Lawrence and Townes).

2. Diapetimorpha alabama Cushman

FIGURES 331,f,g

Diapetimorpha alabama Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 34; ♂, ♀. Type; ♀, Pyriton, Clay Co., Ala. (Washington).

Male: Front wing 3.8 to 5.4 mm. long; clypeus moderately convex; cheek about 0.62 as long as basal width of mandible; tyloids obsolescent, in the form of low, indistinct ridges that extend about 0.3 the length of several segments; metapleurum with very fine, indistinct, rather sparse punctures, with a weakly developed juxtacoxal carina that is usually incomplete; intercubitus about 3.5 as long as width of radial vein.

Head and body light fulvous, marked with white and fuscous as in figure 331,f; palpi and scape whitish, the scape light brown above; pedicel and flagellum fulvous, brown above; legs light fulvous, the front coxa and trochanters and the hind tarsus pale stramineous, the apical 0.4 of fifth segment of hind tarsus brownish.

Female: Front wing 3.9 to 6.0 mm. long; clypeus moderately convex; cheek about 0.63 as long as basal width of mandible; metapleurum with strong, irregular longitudinal wrinkling and interspersed small, indistinct punctures; apical carina of propodeum forming acute sublateral teeth, indistinct or absent laterad of the teeth, strong and complete between the teeth; intercubitus about 0.35 as long as width of radial vein.

Head and body fulvous, marked with white and fuscous as in figure 331,g; palpi white; scape fulvous; pedicel and flagellum fuscous, the flagellum with a white band (incomplete below) that covers about six segments; legs fulvous, the front and middle coxae and trochanters stramineous, the last segment of hind tarsus fulvous brown; wings hyaline, the front wing usually with a very faint median transverse infuscate band.

Specimens (53♂, 31♀): From Alabama (Coleta, Langdale, and Pyriton in Clay Co.); Kansas (Baldwin); Kentucky (Cadiz); Maryland (Chevy Chase L[ake]); New York (Rockaway Beach on Long Island); North Carolina (Clinton, Mills River, Murfreesboro, Raleigh, and Rocky Mount); Ohio (Montgomery Co.); South Carolina (Columbia, Greenville, and McClellanville); and Tennessee (Clarksville, Gatlinburg, Knoxville, and Norris Dam).

Dates of collections are from late spring to early fall. The earliest and latest dates are: May 10, 12, 13, 15, 17, 18, and 19 at McClellanville, S.C.; May 20 at Knoxville, Tenn.; May 24 at Raleigh, N.C.; September 28 and October 1 at Murfreesboro, N.C.; and October 2 at Greenville, S.C.

We have found the species among thick, shaded, low-growing herbaceous vegetation in low, damper parts of deciduous woods. It flies low, seldom more than 30 cm. from the ground. Females commonly crawl over dead leaves of the forest floor. It is of very local distribution.

This species occurs in the Carolinian and Austroriparian faunas.

3. Diapetimorpha macula (Cameron), new combination

Male: Front wing 4.1 to 6.0 mm. long; structurally similar to the male of *D. alabama.*

Head and body light ferruginous to fulvous or largely stramineous, marked with fuscous and whitish about as in figure 332,a; palpi white; scape stramineous, fuscous above; pedicel and flagellum fuscous, the flagellum more or less brownish below, and with a poorly defined postmedian brown section; front and middle legs pale fulvous, their coxae and trochanters stramineous, the fifth segments of their tarsi fuscous; hind coxa, trochanters, femur, and tibia fulvous, the tibia weakly infuscate apically; hind tarsus white, its basitarsus fuscous, usually with the apex white, its fifth segment black; wings subhyaline. Sometimes the middle tarsus is partly infuscate.

Female: Front wing 5.1 to 7.6 mm. long; structurally similar to the female of *D. alabama* except that the body is a little more slender, propodeal teeth a little longer, and apical propodeal carina often absent between the teeth.

Head black and white, body fulvous or ferruginous and black and white, their patterns as illustrated in figure 332,b; palpi fulvous to ferruginous; scape fulvous to ferruginous, more or less infuscate above; pedicel and flagellum fuscous, the flagellum with a white band (incomplete below) that covers about six segments; legs fulvous to ferruginous, their fifth tarsal segments infuscate; wings faintly to distinctly brownish, the apex of front and hind wings a little darker, the front wing with a faint to distinct median brown band.

This species occurs in Mexico and southeastern United States. There are three subspecies, as keyed and described below:

1. First tergite without a distinct apical whitish band, or with a very narrow one; metapleurum of male ferruginous; wrinkles on metapleurum of female weaker; range: southern Florida . . . . **3c. macula ustulata,** new subspecies
   First tergite with an apical whitish band which is moderately wide and very distinct in female, rather indistinct in male; metapleurum of male stramineous or fulvous; wrinkles on metapleurum of female stronger 2
2. Metapleurum of male fulvous; apical carina of female propodeum strong and complete between the propodeal teeth, the teeth about 0.7 as long as their basal width; range: southeastern United States except southern Florida. **3a. macula confederata** Cushman
   Metapleurum of male stramineous; apical carina of female propodeum absent or weak between the propodeal teeth, the teeth about 1.2 as long as their basal width; range: Mexico . . . . **3b. macula macula** (Cameron)

3a. Diapetimorpha macula confederata Cushman, new status

FIGURES 332,a,b

Diapetimorpha confederata Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 34; ♀. Type: ♀, Dallas, Tex. (Washington).

Teeth on propodeum of female about 0.7 as long as their basal width; apical propodeal carina of female complete and strong between the propodeal teeth.

Ground color light fulvous, the pleura of male with some stramineous tinges; apical third of male propodeum stramineous to fulvous; apical 0.25± of postpetiole whitish; wings of female very faintly brownish and with faint, indistinct brownish markings.

Specimens: ♀, reared from *Pilocrosis tripunctaria*, Gainesville, Fla., Henry A. Bess (Washington). ♂, Oneco, Fla., Mar. 25, 1955, John C. Martin (Ottawa). ♀, Sanford, Fla., Sept. 7, 1927, W. E. Stone (Washington). ♀, Tampa, Fla., November 26, C. O. Bare (Washington). 4♂, 1♀, Tarpon Springs, Fla., Mar. 21, 1950, H. Townes (Townes). ♀, Dallas, Ga., July 23, 1944, P. W. Fattig (Washington). ♀, Plummers Is., Md., October 1902, M. W. Lyon, Jr. (Washington). 22♂, 9♀, McClellanville, S.C., May 13 to 19, 1944, H., M., and G. Townes (Townes). ♀, Austin, Tex., A. L. Melander (Moscow). 2♀, Brazos Co., Tex., July 7 and 25, 1937, R. D. Strandtmann (Townes and Ferguson). ♂, New Braunfels, Tex., June 7, 1942, E. S. Ross (San Francisco). ♀, Rock Island, Tex., June 27, 1922, Grace O. Wiley (St. Paul). ♂, Great Falls, Va., June 18, N. Banks (St. Paul).

This subspecies occurs in the Austroriparian fauna.

3b. Diapetimorpha macula macula (Cameron)

Hemiteles macula Cameron, 1886, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 256; ♀. Type: ♀, Presidio, Mexico (London).

Teeth on propodeum of female about 1.2 as long as their basal width; apical propodeal carina of female absent or rather weak between the propodeal teeth.

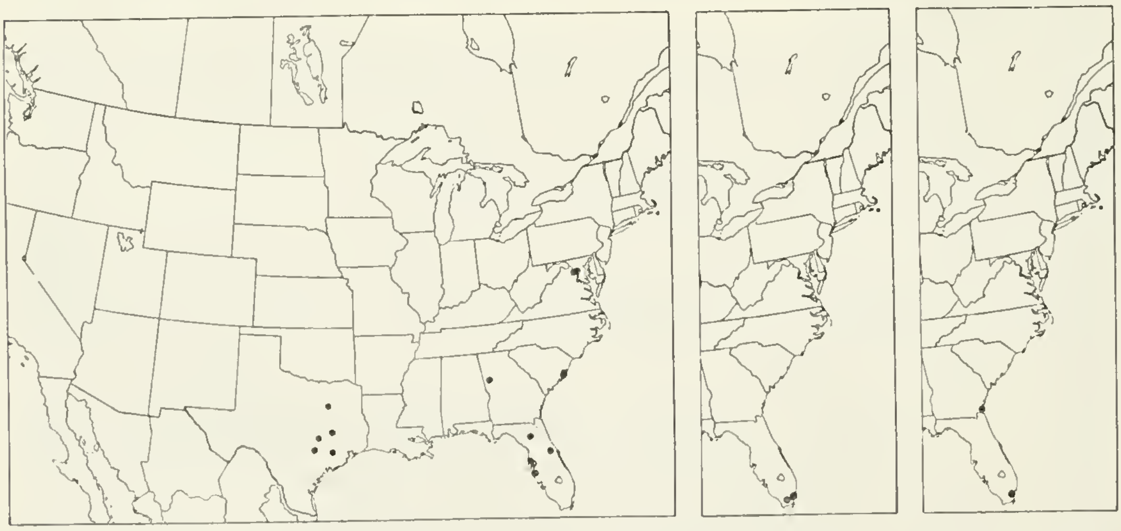
Ground color of male stramineous, the abdomen and legs light fulvous; ground color of female ferruginous; apical 0.25± of postpetiole whitish; wings of female faintly brownish and with pale brown markings.

Specimens: ♂, 7♀, Acayucan, Veracruz, Mexico, Oct. 23, 1957, R. and K. Dreisbach (Dreisbach and Townes). ♀, 21 km. northwest of Santa Lucrecia, Veracruz, Mexico, Apr. 17, 1953, R. C. Bechtel and E. I. Schlinger (Berkeley).

3c. Diapetimorpha macula ustulata, new subspecies

Teeth on propodeum of female about 0.9 as long as their basal width; apical propodeal carina of female weak but complete between the propodeal teeth. The wrinkling on the metapleurum of the single female specimen is a little weaker and less distinctly longitudinal than in the other two subspecies.

Ground color of male light ferruginous, of female moderately dark ferruginous; apex of postpetiole usually tinged with whitish, or some-



Figures 209–211.—Localities: 209 (left), *Diapetimorpha macula confederata;* 210 (center), *D. m. ustulata;* 211 (right), *D. picta.*

times with a very narrow whitish band; wings of female tinged with brownish and with poorly defined but moderately dark brown markings.

Type: ♀, Paradise Key, Fla., Apr. 12, 1951, H. and M. Townes (Washington, USNM 63818).

Paratypes: ♀, Biscayne Bay, Fla. (Washington). 5♂, Paradise Key, Fla., Apr. 8 and 12, 1951, H. and M. Townes (Townes).

4. Diapetimorpha picta, new species

FIGURES 332,c,d

Male: Front wing 5.4 mm. long; clypeus short, strongly convex, its apical 0.3 flattened; cheek 0.48 as long as basal width of mandible; tyloids faint, linear, extending about 0.6 the length of each of 4 segments; metapleurum polished, with small, weak punctures that are separated by about 2.0 their diameter; juxtacoxal carina almost complete but weak and irregular; intercubitus about 2.5 as long as width of radial vein.

Head, body, and hind coxa marked with black, white, fuscous, and fulvous as in figure 332,c; palpi, front of scape, and band on flagellum that covers six segments, white; front and middle coxae and trochanters white, with some fulvous stains; front and middle legs beyond coxae fulvous, their tarsi brown apically; hind trochanters and femur fulvous, the trochanters and base of femora with brown tinges; hind tibia brownish fulvous; hind tarsus white, the basal half of its first segment fulvous brown and all of fifth segment brown; wings hyaline.

Female type: Front wing 6.3 mm. long; clypeus moderately convex, its apical 0.3 weakly impressed; cheek 0.48 as long as basal width of mandible; metapleurum with moderately strong, longitudinal rugae, and scattered, rather weak punctures, its juxtacoxal carina complete but weak; propodeal teeth about 0.37 as long as their basal width; apical carina of propodeum obsolescent between the teeth; intercubitus 2.5 as long as width of radial vein.

Head, thorax, and hind coxa marked with black, white, fuscous, and fulvous as in figure 332,d; palpi white; scape brown; flagellum with an incomplete white band that covers six segments; front and middle coxae and trochanters whitish, with some pale fulvous areas; hind coxa and trochanters fulvous, the coxa with a basal white area above; legs beyond trochanters fulvous; wings hyaline.

Type: ♀, St. Marys, Ga., May 8, 1928, F. M. Uhler (Patuxent Refuge Collection).

Paratype: ♂, Biscayne Bay, Fla., A. T. Slosson (New York).

5. Diapetimorpha rufigaster Cushman

Figures 332,e,f

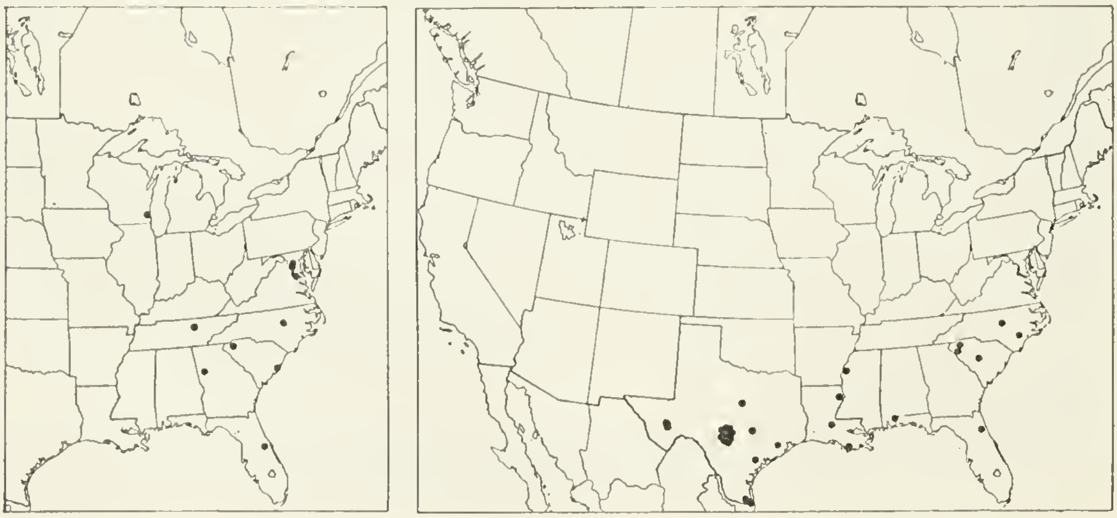
Diapetimorpha rufigaster Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 33; ♀. Type: ♀, Potomac Creek, Va. (Washington).

Male: Front wing 4.7 to 6.3 mm. long; clypeus rather weakly convex; cheek about 0.65 as long as basal width of mandible; tyloids in the shape of sharp longitudinal carinae, occurring on 4 segments, in most cases shorter than the segments; metapleurum with weak indistinct punctures and a rudimentary juxtacoxal carina; intercubitus about 4.5 times as long as width of radial vein.

Head and body marked with yellowish white, black and fulvoferruginous as in figure 332,e; palpi white; scape white below, fuscous above; pedicel and flagellum black, the flagellum with a white band that covers about 5 segments; front and middle legs fulvous, their coxae and trochanters ivory white, those of the middle legs fulvous above; front and middle tarsi brownish apically; hind coxa, trochanters, femur, and tibia fulvoferruginous, the apex of tibia a little darkened; hind tarsus white, the basal 0.35 to 0.75 of its first segment light brown, its fifth segment fuscous.

Female: Front wing 4.5 to 5.8 mm. long; clypeus rather weakly convex; cheek about 0.70 as long as basal width of mandible; metapleurum punctatorugose; propodeal teeth about 0.9 as long as their basal width; apical carina of propodeum bowed strongly forward between the teeth, weak and indistinct; intercubitus about 4.5 as long as the width of radial vein.

Head, thorax, and abdomen marked with black, ivory, and fulvoferruginous as in figure 332,f; palpi white, fulvous apically; pedicel fulvous brown; scape and flagellum fuscous, the flagellum often partly brown basally, with a median white band (incomplete below) that



Figures 212, 213.—Localities: 212 (left), *Diapetimorpha rufigaster;* 213 (right), *D. introita.*

occupies about 5 segments; legs fulvous, the front coxa and basal 0.7± of middle coxa ivory, the tarsi a little darkened apically; wings with a faint yellowish brown tinge

This species is intermediate in some of its characters between the group of species represented by *brunnea*, *alabama*, and *macula*, and the group represented by *introita*, *acadia*, and *rugosa*. Were it not for this intermediate species and a few others in the Neotropics, the genus could be divided into two rather well-marked species groups.

Specimens: ♀, Orange Co., Fla., Apr. 12, 1930, J. E. Sadler (Washington). ♀, Atlanta, Ga., Sept. 7, 1944, P. W. Fattig (Washington). 4♀, Takoma Park, Md., May 24, 1942, June 16 and 30, 1943, and Aug. 16, 1942, H. and M. Townes (Townes). 2♂, Wake Co., N.C., Apr. 23, 1950, and June 2, 1949, H. and M. Townes (Townes). 2♂, McClellanville, S.C., May 15, 1944, H. and M. Townes (Townes). ♀, Venus, Greenville Co., S.C., Sept. 22, 1934, H. Townes (Townes). ♂, Burrville, Tenn., July 1, 1953, Bernard Benesh (Ithaca). ♀, Glencarlyn, Va., May 30, N. Banks (Cambridge). ♂, Milwaukee, Wis., S. Graenicher (Cambridge).

This species occurs in the Carolinian and Austroriparian faunas.

6. Diapetimorpha introita (Cresson)

FIGURES 332,g; 333,a

Mesostenus introitus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 162; ♂. Type: ♂, Bosque Co., Tex. (Washington).

Mesostenus dejectus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 163; ♀. Lectotype: ♀, Comal Co., Tex. (Philadelphia).

Cryptus armatus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 411; ♂. Name preoccupied by Lucas, 1846. Type: ♂, Texas (Washington).

Cryptus ashmeadii Dalla Torre, 1902, Catalogus hymenopterorum, vol. 3, p. 562. New name for *C. armatus*.

Male: Front wing 4.3 to 7.0 mm. long; clypeus weakly convex, its apical 0.3 impressed; cheek about 0.70 as long as basal width of mandible; tyloids in the shape of sharp longitudinal carinae which extend the length of 6 or 7 segments; metapleurum with strong, coarse, rather close punctures, with a juxtacoxal carina that is only partly and imperfectly formed; intercubitus about 3.0 as long as width of radial vein.

Head and body marked with black and pale yellow as shown in figure 332,g; palpi pale stramineous; antenna black, with a white incomplete band that covers about 5 segments; front leg fulvous, partly pale yellow, its tarsus brownish apically; middle leg fulvous, usually partly pale yellow, its tarsus infuscate but pale basally and at the joints, the apex of its coxa and its first trochanter often brownish above; hind coxa, trochanters, and femur fulvous, the first trochanter fuscous above; hind tibia fulvous, its apical 0.35± fuscous; hind basitarsus black, the apical 0.2 to 0.3 usually more or less white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black; wings subhyaline.

Female: Front wing 6.4 to 9.1 mm. long; clypeus weakly convex, its apical 0.3 impressed; cheek about 0.80 as long as basal width of mandible; metapleurum with dense, small, strong punctures partly obscured with dense, irregular, oblique wrinkling; propodeal teeth about 0.63 as long as their basal width; apical carina of propodeum absent, or sometimes partly traceable between the teeth; intercubitus about 3.0 as long as width of radial vein.

Head and thorax black, the clypeus and tegula usually dark ferruginous, the propodeal teeth dusky whitish as in figure 333,a; palpi ferruginous; antenna black, brownish basally, with an incomplete white band that covers about 6 segments; legs ferruginous, the fifth tarsal segments brownish; wings dark brown; abdomen ferruginous.

Specimens (26♂, 39♀): From Florida (Bratt in Escambia Co. and Crescent City); Louisiana (Delta, Opelousas, and Shriever in Terrebonne Co.); Mississippi (Benoit); North Carolina (Faison and Wake Co.); South Carolina (Clemson College, Columbia, and Greenville); Texas (Blanco Co., Cypress Mill, Fort Sam Houston, Gillespie Co., Houston, Kerrville, Laguna Madre 25 miles southwest of Harlingen, Lake Buchanan in Llano Co., Lee Co., Leon Creek in Bexar Co., Marathon, 16 miles south of Marathon, New Braunfels, St. Tomas near Brownsville, Salado Creek in Bexar Co., San Antonio, Victoria, and Willow City); and Mexico (Villa Santiago in Nuevo Leon at 1,500 ft.).

Dates of collection are from mid-spring to early fall. In Texas the species appears to become common early in April and to disappear in mid-summer. There are no Texas records after July 17. For other areas August and September dates of collection are common. Unusually early and late dates of interest are: January 1, March 23, and April 4 at Salado Creek, Bexar Co., Tex.; March 27 at Laguna Madre, 25 miles southwest of Harlingen, Tex.; April 3 at Fort Sam Houston, Tex.; May 8 in Wake County, N.C.; September 29 in Wake Co., N.C.; and October 8 at Greenville, S.C.

We have found the species among unshaded grasses and low herbage, usually at the edges of fields or roadsides.

This species occurs mostly in the Austroriparian fauna.

7. Diapetimorpha acadia Cushman

Diapetimorpha acadia Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 35; ♂, ♀. Type: ♀, Louisiana (Washington).

Male: Front wing 4.0 to 5.2 mm. long; clypeus moderately convex; cheek about 0.75 as long as basal width of mandible; tyloids in the form of a thin, sharp carina on six segments, extending the full length of the four median segments and part of the length of the two end segments; epomia rather weak; metapleurum with coarse, rather close punctures, without a juxtacoxal carina; intercubitus about 0.45 as long as width of radial vein.

Head black, the face, clypeus, cheek, temple, and broad orbits except at top of eye, pale yellow; mandible pale yellow; palpi pale yellow, antenna fuscous, brownish below, the scape pale brown in front, the flagellum with an incomplete white band that covers about 5 segments; thorax yellowish fulvous, the propleurum, central part of pronotum, and prepectus often more or less fuscous; tegula pale fulvous; front and middle legs pale fulvous, their coxae, trochanters, and front side of femora mostly pale yellow, their tarsi darkened apically; hind coxa, trochanters, femur, and tibia fulvous, the apical 0.3± of the tibia somewhat infuscate; hind tarsus fuscous, the first two segments narrowly light brown at base and apex, or the apex of second segment white, the third and fourth segments white or largely white; wings subhyaline; abdomen yellowish fulvous.

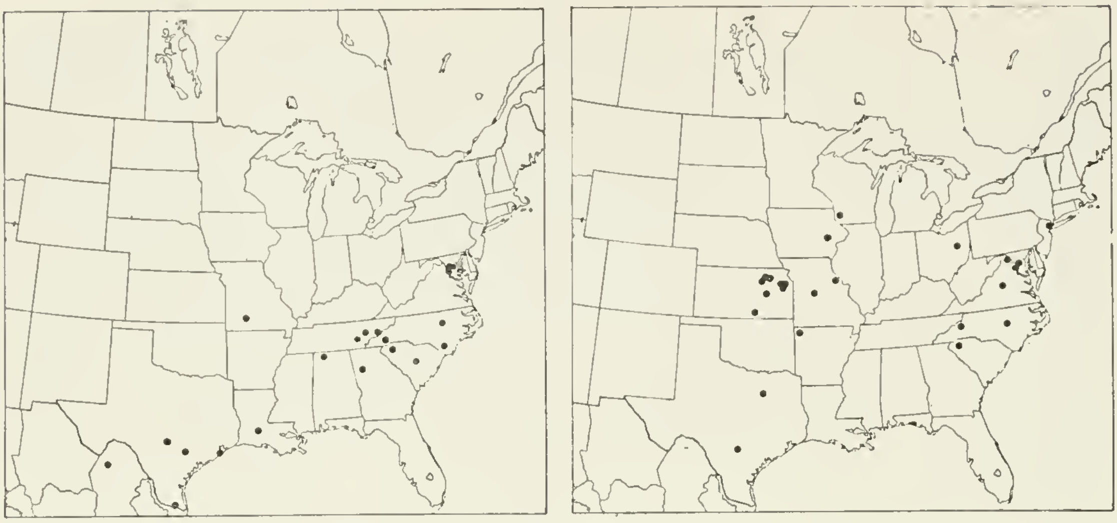
Female: Front wing 2.9 to 6.4 mm. long; clypeus moderately convex; cheek about 0.75 as long as basal width of mandible; epomia rather weak; metapleurum with close, adjacent, or partly confluent punctures, not distinctly wrinkled; apical carina of propodeum strong, sublaterally elevated as a sharp crest, indistinct laterad of the crest.

Head and body fulvous, the seventh tergite with a white spot; palpi fulvous; antenna fulvous, with an incomplete white band that covers about 5 segments, black distad of the band; legs fulvous; wings tinged with yellowish brown, the front wing with a weak but distinct premedial and postmedial brown band.

Specimens (57♂, 26♀): From Alabama (Elgin); District of Columbia (Washington); Georgia (Atlanta); Louisiana (Opelousas); Maryland (North Beach and Takoma Park); Missouri (Willard); North Carolina (Elizabethtown, Raleigh, and Swannanoa); South Carolina (Columbia and Greenville); Tennessee (Dayton, Gatlinburg, and Knoxville); Texas (Brownsville, Galveston, San Antonio, and Victoria); Virginia (Glencarlyn); and Mexico (Puerta de la Goriona in Sierra de la Encantada in Coahuila).

Collection dates are from late spring to early fall. Unusually early and late dates are: April 11 at Victoria, Tex.; May 4 at San Antonio, Tex.; May 14 at Raleigh, N.C.; September 15 at Raleigh, N.C.; September 16 at Gatlinburg, Tenn.; October 2 at Greenville, S.C.; and October 5 at Willard, Mo.

We have found the species on low vegetation in overgrown fields and the edges of woods, particularly at the nectaries of *Cassia nictitans*. On *Cassia* both sexes but particularly the females have a superficial



Figures 214, 215.—Localities: 214 (left), *Diapetimorpha acadia;* 215 (right), *D. rugosa.*

resemblance to *Formica pallide-fulva,* which occurs with it. The peak of abundance is from about August 15 to September 15.

This species occurs in the Carolinian and Austroriparian faunas.

8. Diapetimorpha rugosa, new species

Male: Front wing 4.6 to 5.6 mm. long. Structurally similar to male of *D. acadia* except as noted in the key.

Colored as in male of *D. acadia* except that black markings are usually more extensive, as stated in key.

Female: Front wing 5.1 to 6.4 mm. long; clypeus weakly convex; cheek about 1.05 as long as basal width of mandible; epomia a little stronger and longer than in *D. acadia;* metapleurum more or less coarsely wrinkled and closely punctate, the wrinkles somewhat oblique; apical carina of propodeum forming sublateral crests that are a little sharper than in *D. acadia,* the carina complete between the crests but indistinct laterad of them; intercubitus about 6.0 as long as width of radial vein.

Colored like the female of *D. acadia* but a trifle darker, and usually with fuscous markings on the thoracic sterna.

Type: ♀, among *Trifolium pratense,* Morgan Co., Mo., June 16, 1957 (Washington, USNM 63819).

Paratypes (17♂, 21♀): From Arkansas (Baldwin); District of Columbia (Washington); Iowa (Iowa Co.); Kansas ("Blackjack Creek" in Pottawatomie Co., Clay Co., Johnson Co., Lawrence, Lyon Co., Riley Co., and Wellington); Louisiana; Missouri (Morgan Co. and New Hartford); New Jersey (Westfield); North Carolina (Raleigh and Valle Crucis); Ohio (Wayne Co.); South Carolina (Greenville); Texas (Plano and San Antonio); Virginia (Charlottesville and Falls Church); West Virginia (Bolivar); and Wisconsin (Boscobel).

Dates of collection are from late spring to the end of summer. Unusually early and late dates are: April 3 and 4 at San Antonio, Tex.; May 12 at Baldwin, Ark.; May 29 at Raleigh, N.C.; September 6 at Falls Church, Va.; September 29 in Douglas Co., Kans.; and "October" at Plano, Tex.

We have found the species in open shrubby areas, usually among weeds.

This species occurs in the Carolinian and Austroriparian faunas.

20. Genus Lymeon

FIGURE 318,a

Lymeon Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 176. Type: (*Lymeon annulicornis* Ashmead) = *orbum* (Say); monobasic.

Christolimorpha Viereck, 1913, Proc. U.S. Nat. Mus., vol. 44, p. 564. New synonymy. Type: *Christolimorpha plesius* Viereck; original designation.

Zamastrus Viereck, 1913, Proc. U.S. Nat. Mus., vol. 46, p. 385. New synonymy. Type: *Zamastrus photopsis* Viereck; original designation.

Neogoryphus Roman, 1936, Ent. Tidskr., vol. 57, p. 3. New synonymy. Type: *Ichneumon ariolator* Linnaeus; original designation.

Nasutocryptus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 560. New synonymy. Type: *Nasutocryptus nasutus* Pratt; original designation.

Front wing 3.7 to 9.0 mm. long; general appearance and structure as described for *Diapetimorpha* except as follows: Clypeus usually smaller and with a small, weak median apical impression; areolet more regularly pentagonal; apical propodeal carina of male usually forming more distinct sublateral crests and elsewhere weaker or incomplete; teeth on propodeum of female usually more conical and blunter; first tergite without a subbasal lateral tooth; and second tergite of female with sparse setiferous punctures that are separated usually by more than the length of the hairs. Rarely the discoidella is shortened or absent.

This is a very large genus, including small, bright-colored species, the males often very differently colored from the females. There are four Nearctic species. The rest are Neotropic.

Key to the Nearctic species of Lymeon

1. Thorax black and white 2
   Thorax fulvous or ferruginous, with or without white markings 3
2. Mesoscutum with a single median white spot; hind coxa black and white. **1. cinctiventris** (Cushman)
   Mesoscutum with a pair of submedian white stripes; hind coxa of male fulvous and white with a black stripe above; hind coxa of female fulvous, usually with a whitish mark above . . . . **2. orbum** (Say)
3. Clypeus simply convex, without a conical point; discoidella completely absent; thorax with white markings . . . . **3. leiponeuron,** new species
   Clypeus extending ventrally as a conical point; discoidella present; thorax without white markings . . . . **4. nasutum** (Pratt)

1. Lymeon cinctiventris (Cushman)

Figures 333,b,c

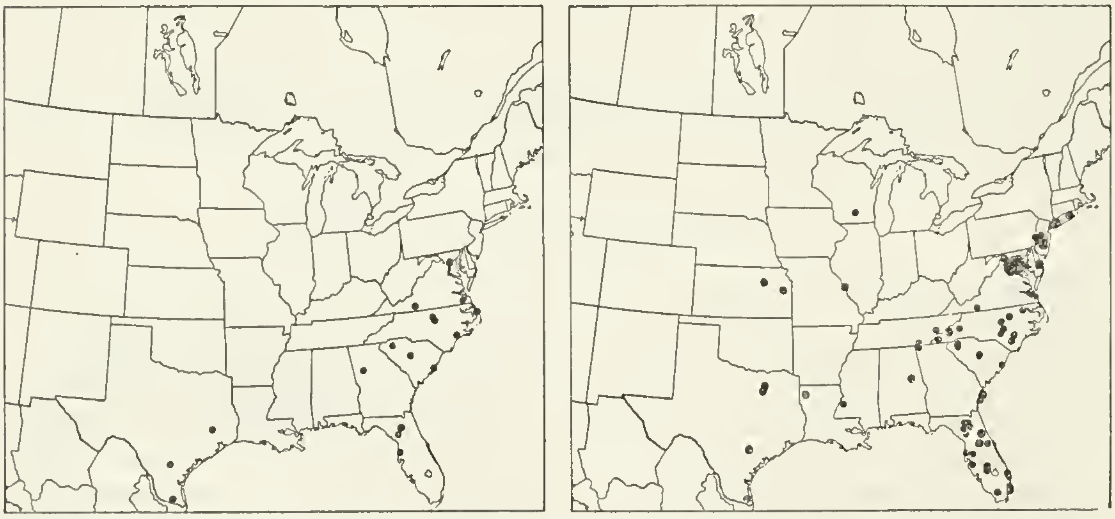
Mesostenus laticinctus Cresson, 1878, Canadian Ent., vol. 10, p. 208; ♀. Name preoccupied by Walker, 1874. Type: ♀, Louisiana (Philadelphia).

Mesostenus cressonii Dalla Torre, 1901. Catalogus hymenopterorum, vol. 3, p. 539. New name. Name preoccupied by Ashmead, 1900.

Diapetimorpha cinctiventris Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 32. New name.

Front wing of male 4.3 to 6.7 mm. long, of female 4.2 to 6.4 mm. long; clypeus convex, not prolonged into a conical point; lateral lobe of mesoscutum with rather coarse punctures that are moderately dense all over; discoidella present; thyridium of second tergite subcircular.

Head, body, and hind coxa marked with black and white as in figures 333,b (♂) and 333,c (♀); palpi white; antenna black, that of female with a white band that covers about 7 segments; front and middle coxae and trochanters white; front and middle femora and tibiae fulvous; front tarsus of male whitish, its last segment brown; front and middle tarsi of female stramineous, their fifth segments brown; middle tarsus of male fulvous or light brown, darker apically, the last segment brown; hind trochanters of male fuscous, their apical and basal margins whitish; hind trochanters of female and hind femur of both sexes fulvous, the hind femur of male narrowly infuscate at apex; hind tibia of male brownish fulvous, its basal 0.15± and apical 0.3± black; hind tibia of female fulvous; hind tarsus of male white, the basal 0.3± of its first segment and apical 0.5± of its last segment black; hind basitarsus of female fulvous, more or less whitish apically; segments 2–4 of female hind tarsus whitish; segment 5 of female hind tarsus dark brown.



Figures 216, 217.—Localities: 216 (left), *Lymeon cinctiventris;* 217 (right), *L. orbum.*

Specimens (38♂, 26♀): From District of Columbia (Washington); Florida (Gainesville, Gulf Hammock, and Tarpon Springs); Georgia (Atlanta); North Carolina (Durham, Kill Devil Hills, New River, and Wake Co.); South Carolina (Columbia, Easley, and McClellanville); Texas (Hidalgo, Navasota, and San Antonio); and Virginia (Lake Drummond and Martinsville).

Collection dates are from mid-spring to early fall. Unusually early and late seasonal records are: February 25 at Hidalgo, Tex.; March 24 at Gainesville, Fla.; April 3 at San Antonio, Tex.; May 13, 15, 16, and 17 at McClellanville, S.C.; September 20 to 30 at New River, N.C.; and September 21 at Columbia, S.C.

We have found the species in moderately dense deciduous woods. The habitat and flight habits are like those of *Lymeon orbum.*

This species occurs in the Austroriparian fauna.

2. Lymeon orbum (Say)

Figures 333,d,e

Cryptus orbus Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 231 (Leconte ed., vol. 2, p. 688); [♀]. Type: ♀, Indiana (destroyed).

Mesostenus diligens Cresson, 1878, Canadian Ent., vol. 10, p. 207; ♀. Type: ♀, Illinois (Philadelphia).

Lymeon annulicornis Ashmead, 1894, Insect Life (U.S. Dep. Agr.), vol. 7, p. 243; ♀. Type: ♀, Utica, Miss. (Washington).

Front wing of male 3.5 to 5.5 mm. long, of female 4.3 to 8.2 mm. long; clypeus convex, not prolonged into a conical point; lateral lobe of mesoscutum sparsely punctate, the punctures moderately dense anteriorly; discoidella present; thyridium of second tergite transverse.

Male: Head, body, and hind coxa marked with black, white, and fulvous as in figure 333,d; antenna black, the scape often brownish in front; palpi white; front and middle trochanters white; front and middle femora and tibiae pale fulvous; front tarsus very pale fulvous, its fifth segment mostly fuscous; middle tarsus brown, stramineous at the joints; hind trochanters fuscous or the second trochanter brownish fulvous; hind femur fulvous, its apex weakly infuscate; hind tibia brownish fulvous, its basal 0.15 and apical 0.3 fuscous; hind tarsus white, the basal 0.3± of first segment and all or most of its last segment black; wings hyaline.

Female: Head, body, and hind coxa marked with black, white, and fulvous as in figure 333,e; basal two segments of palpi white, the rest infuscate; antenna black, with a white band that covers about 7 segments; front and middle coxae and first trochanters whitish with some pale fulvous areas, the rest of front and middle legs pale fulvous, the last two segments of their tarsi fuscous; hind coxa fulvous, usually with a white area dorsally; hind trochanters, femur, and tibia fulvous; hind tarsus whitish, the base of its first segment more or less fulvous and its last two segments fuscous; wings hyaline.

Specimens (103♂, 173♀): From Alabama (Pyriton in Clay Co.); Delaware (Milton); District of Columbia (Washington); Florida (Archbold Biological Station near Lake Placid, 2 miles west of Archer, Biscayne Bay, Crescent City, Fort Ogden, Gainesville, Gulf Hammock, Highland Hammock near Sebring, Interlachen, Lake Co., Lake Worth, Matheson Hammock in Miami, Oneco, Orlando, Paradise Key, South Palm Beach, Starke, and Tarpon Springs); Georgia (Cloudland Canyon State Park, St. Catherines Island, and St. Simons Island); Kansas (Baldwin and Riley Co.); Louisiana (Forbing); Maryland (Berwyn, Bowie, Glen Echo, Patuxent Refuge at Bowie, near Plummers Island, Takoma Park, and near Twining in D.C.); Missouri (St. Louis); New Jersey (Bridgeboro, Evesboro, Florence, Moorestown, Riverton, and Tabernacle); New York (Babylon, Cold Spring Harbor, Farmingdale, Orient on Long Island, and Sea Cliff); North Carolina (Clinton, Crabtree Meadows in Yancey Co. at 3,600 ft., Fayetteville, Garland, Marshall, Murfreesboro, Nantahala Gorge at 2,000 ft., Raleigh, Rocky Mount, and Southern Pines); Pennsylvania (Philadelphia and Valley Forge); South Carolina (Columbia, Greenville, McClellanville, and Mountain Lake in Greenville Co.); Tennessee (East Ridge and University Farm near Knoxville); Texas (Brownsville, Dallas, Plano, and Victoria); Virginia (Arlington, Camp Peary, Cape Henry, Chain Bridge, Dead Run in Fairfax Co., Falls Church, Galax, Great Falls, Mount Vernon, and Vienna); West Virginia (Bolivar); and Wisconsin (Madison).

Collection dates are from mid-spring to mid-fall. Unusually early and late seasonal records are: March 4 at Archbold Biological Station, near Lake Placid, Fla.; March 10 at South Palm Beach, Fla.; March 19 at Tarpon Springs, Fla.; March 24 at Forbing, La.; April 23 in Wake Co., N.C.; May 25 at Great Falls, Va.; October 18 at Takoma Park, Md.; October 27 at Arlington, Va.; and October 31 and November 8 at Southern Pines, N.C.

Reared specimens are as follows: 2♂, 3♀, from egg cocoons of *Zelotes* sp. near Twining, D.C., in Md., Apr. 7, 8, 10, and 18, 1898, A. Busck. ♂, from drassid egg cocoon, Vienna, Va., Apr. 12, 1912, R. A. Cushman. ♂, from drassid egg cocoon, May 2, T. Pergande. ♂, from *Lineodes vulnifica*, Brownsville, Tex., Oct. 14, 1944. ♀, from *Phereoeca walsinghami*, Gainesville, Fla., August 1957, L. A. Hetrick. ♂, from coleophorid case on *Polygonum*, St. Louis, Mo., June 23, 1876. ♂, from chrysopid cocoon, Crescent City, Fla. Also: 10

reared lots from *Grapholitha molesta*, from various localities, by various workers.

We find the species in thickets and in and at the edges of moist deciduous woods, most of them on or flying among foliage at one to two meters height. The males have a fast, weaving flight, like the male of *Cryptanura banchiformis*, and seldom alight. Females are slower and are more often seen resting on foliage.

This species occurs in the Carolinian, Austroriparian, and Tropical faunas. It parasitizes a great variety of small cocoons and cases.

3. Lymeon leiponeuron, new species

Figures 333,f,g

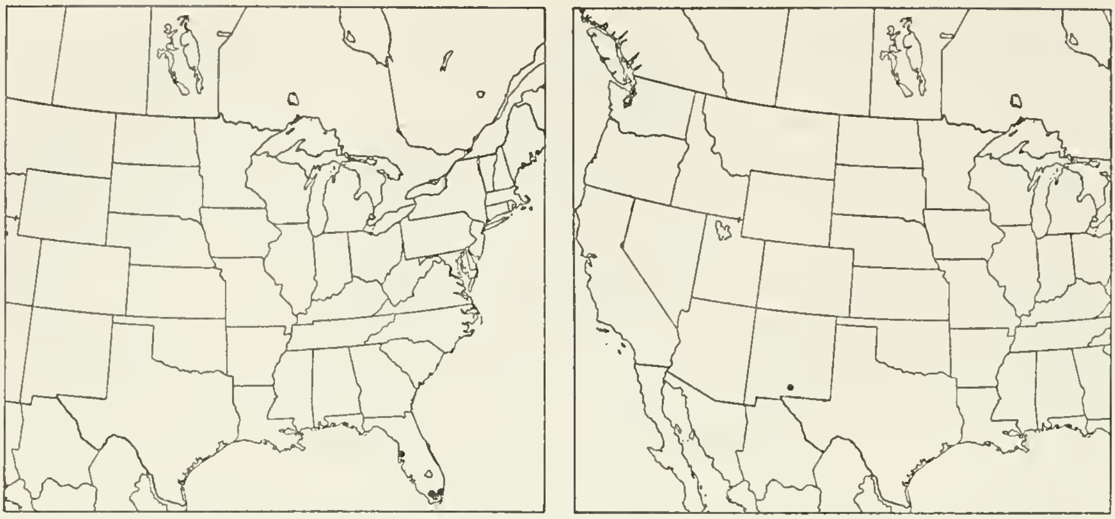
Front wing of male 3.7 to 4.1 mm. long, of female 3.5 to 4.0 mm. long; clypeus convex, not prolonged into a conical point; lateral lobe of mesoscutum polished, with very sparse, small, weak punctures; discoidella completely absent; thyridium of second tergite transverse.

Head, body, and hind coxa marked with ferruginous, white, and black as in figure 333,f (♂) and 333,g (♀); palpi of male white, of female fulvous; scape fulvous, the rest of antenna brown, darker in male, without a white band; legs fulvoferruginous, the front and middle coxae of both sexes and the front and middle trochanters of male, white, the front and middle coxae of female with some fulvous areas; front and middle tarsi of male brownish apically; hind tibia of male somewhat darkened; hind tarsus of male fuscoferruginous; wings faintly infuscate, a little more strongly infuscate in female.

This species appears to be an endemic of southern Florida. It is related to *Lymeon fuscipenne* (Brullé) and *L. subflavescens* (Cresson), both of the West Indies. These two have been in the separate genus *Christolimorpha* because of an abbreviated (or absent) discoidella. The species *leiponeuron* lacks this vein entirely. The shortening or loss of the discoidella helps to distinguish these three as a group of related species, but their other characters are very similar to those of the genotype of *Lymeon*, so it seems best to merge *Christolimorpha* with *Lymeon*. *Hemiteles fuscipennis* Brullé 1846 and *H. subflavescens* Cresson 1865 are hereby referred to *Lymeon* (new combinations).

Type: ♂, Everglades National Park, Dade Co., Fla., Apr. 10, 1955, H. V. Weems, Jr. (Washington, USNM 63820).

Paratypes: ♀, Biscayne Bay, Fla., A. T. Slosson (New York). 2♂, 2♀, Paradise Key, Fla., Apr. 7 and 12, 1951, H. and M. Townes (Townes). ♀, Tarpon Springs, Fla., Apr. 17, 1952, G. S. Walley (Ottawa).



FIGURES 218, 219.—Localities: 218 (left), *Lymeon leiponeuron;* 219 (right), *L. nasutum.*

4. Lymeon nasutum (Pratt), new combination

FIGURE 334,a

Nasutocryptus nasutus Pratt, 1945, Amer. Midl. Nat., vol. 34, p. 561; ♀. Type: ♀, Alamogordo, N. Mex. (Philadelphia).

Male: Unknown.

Female: Front wing about 4.8 mm. long; clypeus extending ventrally as a conical point; mesoscutum mat, with sparse, shallow punctures; discoidella present; thyridium of second tergite obscured in the specimen at hand.

Fulvous. Orbit narrowly and scutellum pale fulvous; flagellum blackish, with a white band that covers 4 segments (incomplete below); fifth segment of hind tarsus brown (other tarsi broken); wings hyaline, the front wing with a median and subapical lightly infuscate band; apical 0.18 of first tergite yellow; ovipositor sheath fulvous, its apical 0.3 infuscate.

The species is known only from the type and paratype. The figure and the above description are from the paratype.

Specimen: ♀ (paratype), Alamogordo, N. Mex., May 5, 1902 (St. Paul).

21. Genus Pachysomoides

FIGURE 318,b

Pachysoma Szépligeti, 1916, Ann. Mus. Nat. Hungarici, vol. 14, p. 290. Name preoccupied by Macleay, 1821, by Geoffroy, 1828, etc. Type: (*Pachysoma albopictum* Szépligeti) = *stupidus* (Cresson); monobasic.

Pachysomoides Strand, 1917, Int. Ent. Zeitschr., vol. 10, p. 137. New name.

Polistiphaga Cushman, 1925, Journ. Washington Acad. Sci., vol. 15, p. 391. New synonymy. Type: (*Mesostenus arvalis* Cresson) = *fulvus* (Cresson); original designation.

Front wing 3.4 to 7.0 mm. long; body rather stout, somewhat depressed; frons unarmed; clypeus small, strongly convex, its apical

0.4 abruptly declivous, its apical margin truncate or weakly convex, without a median point; mesoscutum moderately convex, mat, and with moderately dense to sparse medium-sized punctures; notaulus sharp, reaching beyond center of mesoscutum; epomia strong, the upper edge of pronotum with a blunt tubercle at its upper end; propodeum with distinct dorsal and posterodorsal faces, with more or less distinct longitudinal carinae as well as the two transverse carinae, its transverse carinae both strong and complete, the apical transverse carina with strong sublateral crests; propodeal spiracle circular; areolet very small, subquadrate, the second intercubital absent or vestigial; ramellus absent; nervulus opposite or a little basad of basal vein; second discoidal cell moderately narrowed basally; mediella strongly arched; nervellus broken below the middle; axillus close to anal margin; first abdominal segment rather short, broad, without a subbasal lateral tooth, its ventrolateral carina complete and moderately sharp, its dorsolateral carina blunt but complete, its median dorsal carinae absent or weak, if present reaching to a little beyond spiracle; spiracle of first tergite near its apical 0.40; second tergite mat, with fine weak punctures that are separated by more than the length of the hairs; tergite 7 without a median white spot but often margined with white or almost entirely white; ovipositor sheath about 0.12 as long as front wing; ovipositor moderately slender, its tip somewhat sagittate.

Pachysomoides is a small genus, Neotropic in distribution except that two species range northward into the Nearctic region. So far as known, it is parasitic only in the nests of *Polistes*.

Key to the Nearctic species of Pachysomoides

1. Body black and white; punctures on mesoscutum sparse, separated by about 1.5 their diameter . . . . **1. stupidus** (Cresson)
   Body fulvous with inconspicuous whitish and fuscous areas; punctures on mesoscutum dense, separated by about 0.4 their diameter. **2. fulvus** (Cresson)

1. Pachysomoides stupidus (Cresson), new combination

Figure 334,b

Mesostenus stupidus Cresson, 1873, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 159; ♀. Type: ♀, Orizaba, Mexico (Philadelphia).

Pachysoma albopictum Szépligeti, 1916, Ann. Mus. Nat. Hungarici, vol. 14, p. 290; ♀. New synonymy. Type: ♀, Mexico (Budapest).

Polistiphaga zonata Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, pp. 4, 56; ♀. Type: ♀, Victoria, Tex. (Washington).

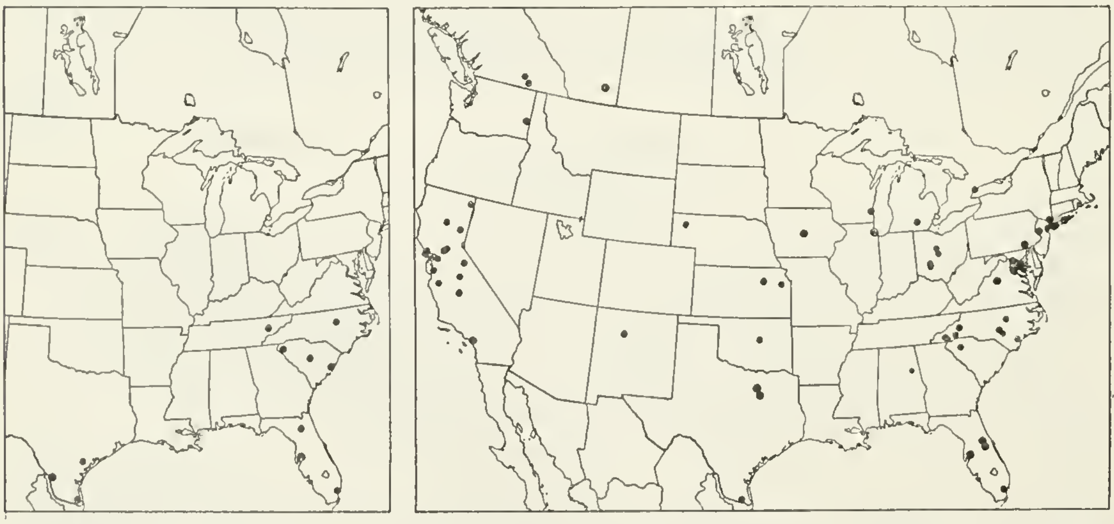
Front wing 3.4 to 6.3 mm. long; punctures on mesoscutum weak, separated by about 1.5 their diameter; punctures on mesopleurum so fine and weak as to be difficult to see; basal and apical carinae of propodeum farther apart than in *P. fulvus*.

Head, body, and hind coxa marked with black, white, and fulvous as in figure 334,b; palpi white; antenna black, the under half of scape and a band on flagellum white; mesoscutum with a white stripe on outer margin of its median lobe and another on inner margin of lateral lobe; front and middle coxae and trochanters whitish with a fulvous tinge; femora and tibiae pale fulvous; front and middle tarsi stramineous, infuscate apically; hind tarsus of male white, the basal 0.4 of first segment and apical 0.6 of last segment fuscous; hind tarsus of female pale fulvous, the basal 0.4 of first segment medium fulvous, and last segment entirely black.

Specimens (42♂, 18♀): From Florida (Gainesville, International Airport at Miami, and Tampa); North Carolina (Wake Co.); South Carolina (Clemson, Columbia, and McClellanville); Tennessee (Knoxville); and Texas (Harlingen, Laredo (in fruit from Mexico), and Victoria).

Collection dates are all from August to October, except for two Florida records of the winter months. Unusually early and late seasonal records are: January 1 at Miami, Fla.; February 15 at Tampa, Fla.; August 3 in Cameron Co., Tex.; August 15 at Harlingen, Tex., and at Clemson, S.C.; October 30 in Wake Co., N.C.; and November 10 at Victoria, Tex. Finding the species only late in the season in the northern part of its range suggests that this may be another case where overwintering is south of the frost line and there is a northward migration every season.

One series is labeled as reared: ♂, 3♀, from nest of *Polistes* sp., Victoria, Tex., Nov. 10, 1914, J. D. Mitchell. According to unpublished observations by Dr. R. L. Rabb in Wake Co., N.C., the biology of *P. stupidus* is similar to that of *fulvus* (*q. v.*), except for an average larger number of parasites per host. He found it usually parasitizing



Figures 220, 221.—Localities: 220 (left), *Pachysomoides stupidus;* 221 (right), *P. fulvus.*

Polistes of the "Canadensis group" (*P. annularis* and *P. exclamans* in North Carolina), while *Pachysomoides fulvus* usually parasitizes *Polistes* of the "Fuscatus group" (*P. fuscatus, P. rubiginosus, P. metricus*, etc.).

This species ranges from southeastern United States to southern Brazil. In the Neotropics it is divisible into several subspecies or races, none of which have been distinguished in literature and named. The typical subspecies (*stupidus*) was described from Mexico and this is the one ranging northward into the United States, and for which distributional and host data are given above.

2. Pachysomoides fulvus (Cresson), new combination

FIGURE 334,c

Mesostenus? fulvus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 316; ♂. Type: ♂, Illinois (Philadelphia).

Mesostenus arvalis Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 163; ♀. Lectotype: ♀, Bosque Co., Tex. (Philadelphia).

BIOLOGY: Dow, 1932, Psyche, vol. 39, p. 16.—Gaul, 1940, Canadian Ent., vol. 72, pp. 240–242.—Rau, 1941, Ann. Ent. Soc. America, vol. 34, pp. 364–365.

Front wing 4.5 to 7.0 mm. long; punctures on mesoscutum moderately strong, separated by about 0.4 their diameter; punctures on mesopleurum small and crowded but strong enough to be easily visible; basal and apical carinae of propodeum closer together than in *P. stupidus*.

Head, body, and hind coxa fulvous, with whitish and fuscous markings as in figure 334,c; palpi stramineous; scape and pedicel blackish, whitish beneath in male, more or less fulvous beneath in female; flagellum black, with a narrow white band; legs fulvous, the front and middle coxae more or less whitish, especially in male; hind tarsus brownish fulvous, usually the second through fourth segments and sometimes apex of first segment, or at least the third segment, whitish.

Specimens from the Rocky Mountains and westward have the ground color usually a little darker and the whitish markings usually a little less extensive than in specimens from the eastern half of the continent. The most constant difference is in the whitish stripes just above and below the sternaulus, present in specimens from the East, usually absent or reduced in specimens from the West.

Specimens (76♂, 185♀): From Alberta (Medicine Hat); Alabama (Cheaha State Park); Arkansas; British Columbia (Robson, Tulip Creek at Arrow Lake, and Waldies Road in Robson up to 3,500 ft.); California (Antioch, Arroyo Seco Camp in Monterey Co., Conness Glacier in Yosemite at 12,000 ft., Cypress Ridge in Marin Co., Davis Creek, Elk Grove, Fresno, Huntington Beach, Los Molinos, Mount

Tamalpais, 4 miles west of Quincy, Sacramento, San Francisco, Santa Cruz Mts. in Santa Clara Co., and Visalia); Florida (Larkins in Dade Co., Orange Co., Osceola Co., and Tampa); Illinois (Chicago); Iowa (Ames); Kansas (Lawrence and Manhattan); Maryland (Bowie, Chesapeake Beach, College Park, Glen Echo, and Takoma Park); Michigan (Ann Arbor); Nebraska (Crawford); New Jersey (New Brunswick and Port Murray); New Mexico (Jemez Springs at 6,400 ft.); New York (Babylon, Cold Spring Harbor, Farmingdale, Nyack, and Yaphank on Long Island); North Carolina (near Busick at 4,000 ft., Candor, Franklin at 2,000 ft., Hendersonville, 4.4 miles west of Highlands in Cliffside Recreation Area at 3,000 ft., Holly Shelter, Raleigh, and Southern Pines); Ohio (Delaware Co., Franklin Co., Montgomery Co., and Xenia); Oklahoma (Payne Co.); Ontario (Toronto); Pennsylvania (Oxford); South Carolina (Greenville); Texas (Dallas, Hidalgo Co., and Rosser); Virginia (Charlottesville, Falls Church, Newington in Fairfax Co., and "Stubblefield Falls"); Washington (Pullman); Wisconsin (Milwaukee); and Cuba (Central Soledad in Cienfuegos).

Collection dates are mostly from early summer to mid-fall. Unusually early and late seasonal records are: January 24 at Tulip Creek, Arrow Lakes, B.C.; February 15 at Tampa, Fla.; April 11 at Cypress Ridge, Marin Co., Calif.; April 16 at Southern Pines, N.C; May 2 in Cheaha State Park, Ala.; May 9 at Boulder, Colo.; May 24 at Franklin, N.C.; June 2 at Ithaca, N.Y.; June 12 at Medicine Hat, Alta.; October 11 at Yaphank, Long Island, N.Y.; October 20 and 25 and November 2 and 3 at Takoma Park, Md.; October 30 at "Stubblefield Falls," Va.; and December 22 at Crawford, Nebr.

Host records on pin labels are as follows: 2 rearings from *Polistes apachus*, 1 from *P. cubensis*, 1 from *P. fuscatus*, and 4 from *Polistes* sp. According to both pin label data and our field experience the species is commonest from August to October. Most commonly it is seen on the walls or windows of buildings. Late in the season a large portion of *Polistes* nests contain cocoons of this parasite and one has only to collect a few nests to rear out a good set of specimens.

According to published accounts, eggs are laid on mature larvae of *Polistes*, usually just before the cocoon is spun. The parasite larvae, usually two to six per host, begin feeding just after the host has spun its cocoon and pupated, concentrating on the abdomen of the newly formed pupa. They may, however, feed instead on the larva, before or after cocooning. The mature parasite larvae spin their cocoons within the host cocoon. Gaul (1940) believes that hibernation is in the adult stage, and all available evidence supports his view.

This species occurs throughout the United States, southern Canada, and Mexico. We have seen it also from Cuba.

22. Genus Acerastes

FIGURE 319,a

Acerastes Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 53. Type: *Mesostenus pertinax* Cresson; original designation.

Front wing 4.0 to 9.8 mm. long; body rather slender; frons unarmed; clypeus moderately small, rather strongly convex, its apical 0.35± abruptly declivous, its apical margin moderately convex, without a median point; mesoscutum rather strongly convex, polished, its punctures of moderate size, irregularly spaced, rather close anteriorly, elsewhere sparser; notaulus sharp, deep, extending beyond middle of mesoscutum; epomia strong, the upper margin of pronotum at its dorsal end with a strong tubercle; propodeum moderately convex, its basal carina sharp and complete, its apical carina represented by sublateral tubercles that tend to be rounded in female, and often crestlike in male; propodeal spiracle circular or short oval; areolet very small, roughly pentagonal, the second intercubital absent or vestigial; ramellus absent; nervulus a little basad of basal vein; base of second discoidal cell narrowed to a point or almost so; mediella strongly arched; nervellus broken below the middle; axillus close to anal margin; first abdominal segment moderately slender, its spiracle near its apical 0.40, without a subbasal lateral tooth and without distinct longitudinal carinae; second tergite mat or subpolished, in female its punctures small and sparse, separated by a little more than the length of the hairs, in male the punctures denser; tergite 7 without a median white spot; ovipositor sheath about 0.14 as long as front wing; ovipositor moderately slender, with a long tapered point.

Acerastes is a moderately large Neotropic genus. One of its more widespread species enters southeastern United States.

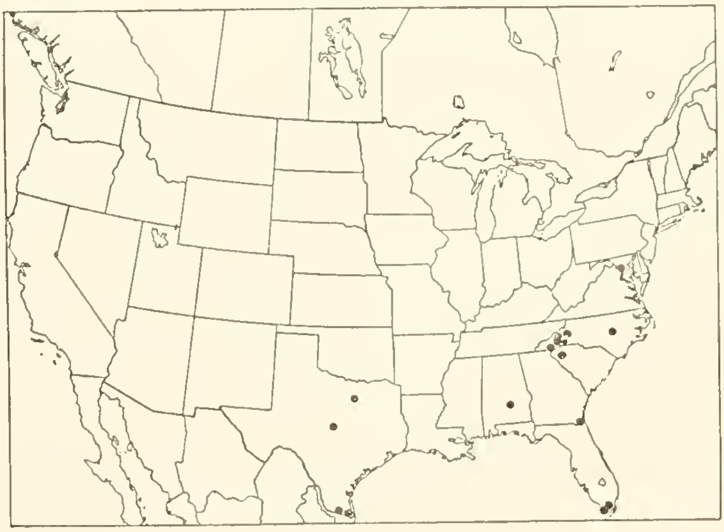


FIGURE 222.—Localities for *Acerastes pertinax.*

Acerastes pertinax (Cresson)

FIGURE 334,d

Mesostenus pertinax Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 163; ♀. Type: ♀, Bosque Co., Tex. (Washington).

Front wing 4.0 to 5.8 mm. long.

Head, body, and hind coxa marked with fulvous, black, and white as in figure 334,d; palpi, front of scape, band on flagellum, a pair of median dashes on mesoscutum, and more or less of median part of hind tarsus, white; antenna black except where described as white; front and middle legs fulvous, their tarsi brown apically, their coxae and trochanters often varied with white or more or less entirely white, especially the front ones; hind trochanters, femur, and tibia fulvous, the apex of tibia of male infuscate; hind basitarsus fuscous in male, fulvous in female, its apex white; second segment of hind tarsus white; third and fourth segments of hind tarsus varying from entirely white to entirely fuscous, the fifth segment always fuscous.

The black markings on head and thorax are occasionally replaced by piceous or dusky ferruginous, and the black and fulvous markings on propodeum are variously blended or replaced by one another. A race in Paraguay and southern Brazil has the hind tarsus more extensively white, with only the basal 0.3± of the first segment darkened and the last segment and sometimes the apex of the fourth blackish.

Specimens (15♂, 51♀): From Alabama (Pickett Springs near Montgomery); Florida (Hilliard, Middle Cape near Cape Sable, and Paradise Key); Maryland (Takoma Park); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Hamrick, Highlands, Marion, Mount Mitchell at 5,200 ft., and Wake Co.); South Carolina (Greenville); Texas (Brownsville, Hidalgo Co., and Plano); Brazil (Nova Teutonia in Santa Catarina and near Tijuca at 500 to 1,000 m. in Serras das Orgaos in Rio de Janeiro Province); Canal Zone (Cano Saddle at Gatun Lake and Plantation Borracho); Cuba (Soledad Cienfuegos); Honduras (Prieta); Jamaica (Blue Castle and Hope Farm); México (Minatitlán); Paraguay (San Bernardino); Puerto Rico (Lake Guanico); and Venezuela (San Esteban near Puerto Cabello).

Collection dates in the tropical part of the range show no seasonal pattern, but north of the frost line they are all in late summer or fall. The species has been found in such cool localities as at 5,200 ft. on Mount Mitchell, N.C., but the northern limit of collections is Maryland. These data indicate that it overwinters south of the frost line and works northward every season. The earliest collection dates for the United States are: February 21 and April 2 at Paradise Key, Fla.; March 23 at Brownsville, Tex.; August 6 at Hilliard, Fla.; August 19 in Wake Co., N.C.; August 20 at 5,200 ft. on Mount Mitchell, N.C.; and August 21 at Highlands, N.C. The latest United States records are: September 26 in Wake Co., N.C.; October 28 at Takoma Park, Md.; and December 18 at Cape Sable, Fla.

The usual habitat is weedy fields or meadows.

This species occurs in southeastern United States and ranges southward to southern Brazil. It appears to overwinter in southern Florida and near Brownsville, Tex., and to work northward each season.

23. Genus Polycyrtidea

Figure 319,b

Polycyrtidea Viereck, 1913, Proc. U.S. Nat. Mus., vol. 46, p. 382. Type: *Polycyrtidea gracilis* Viereck; original designation.

Front wing 4.8 to 6.5 mm. long; body very slender; frons with a short conical horn in the middle; clypeus rather small and strongly convex, its apical 0.3 abruptly declivous, its apical margin evenly convex, without a median point; mesoscutum moderately convex, polished or subpolished, its punctures coarse or of moderate size, separated by about 2.0 their diameter; notaulus sharp and deep, reaching beyond center of mesoscutum; epomia strong, ending dorsally in a very strong tubercle on upper edge of pronotum; propodeum short, rather weakly convex, its basal carina sharp and complete, its apical carina represented by low sublateral tubercles; propodeal spiracle subcircular; areolet very small, not well formed, the second intercubitus absent; ramellus absent; nervulus a little basad of basal vein; base of second discoidal cell narrowed to a point; mediella very strongly arched; nervellus broken below the middle, the discoidella usually faint; axillus moderately close to anal margin; first abdominal segment long, very slender, terete, without a subbasal lateral tooth, its spiracle near its apical 0.41; second tergite mat or subpolished, with fine, weak punctures that, in female, are separated by about the length of the hairs, somewhat denser in male; tergite 7 without a median pale spot but often margined with yellow; ovipositor sheath about 0.21 as long as front wing; ovipositor rather slender, with a long tapered point.

Polycyrtidea is a small genus, of Neotropic distribution. One species ranges as far north as southern Texas. The rest of the described species are: *Bassus meritorius* Fabricius 1804 (British Guiana), *Mesostenus pusillus* Cresson 1865 (Cuba), *Agrypon flavopictus* Ashmead 1900 (Grenada and Venezuela to southern Brazil), and *Polycyrtidea gracilis* Viereck 1913 (Paraguay). *Polycyrtidea meritoria* (Fabricius) is a new combination. The species are rather closely similar and it is often difficult, with the meager material in collections, to decide on specific limits. Some of the species named as distinct may be only subspecies.

Polycyrtidea limitis Cushman

Polycyrtidea limitis Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 52; ♀. Type: ♀, Brownsville, Tex. (Washington).

Front wing 4.8 to 6.2 mm. long. Head and mandible yellow, the occiput and median part of frons and vertex black; thorax reddish brown to blackish, the upper and lower margins of pronotum broadly, propleurum, a pair of dashes on middle of mesoscutum, tegula, subtegular ridge, most of mesopleurum except marginally, metapleurum, upper division of metapleurum, and apical 0.6± of propodeum except at abdominal attachment, yellow; palpi yellow; antenna blackish brown, the scape yellow in front and flagellum of female with a white stripe above that covers about 5 segments; front and middle legs fulvous, their coxae, trochanters, and under side of femora yellow, their tarsi infuscate apically; hind coxa yellow, with a large blackish to reddish brown mark on its basal ventral part and a smaller one above near its apex; hind first trochanter brown, yellow below; hind second trochanter brownish, yellow basally below; hind femur and tibia fulvous, the tibia brownish at base and apex; hind tarsus fuscous, the apical 0.5± of first segment, all of second segment, and usually part to all of third segment, white; abdomen fulvous, the basal 0.4± of first segment, and apical band on all tergites yellow; second tergite infuscate at base.

In an earlier publication (1951, U.S. Dep. Agr., Agr. Monogr., No. 2, p. 273) this species was considered a synonym of *P. flavopicta* Ashmead, but according to specimens now at hand it is at least distinguishable. *P. flavopicta* differs from *P. limitis* in having a little less yellow on the temple, and large dorsobasal and small apicoventral yellow areas on the hind coxa, which are not connected. In *P. limitis* all yellow areas on the hind coxa are connected. The two forms are allopatric, *limitis* being known from southern Texas to Costa Rica and

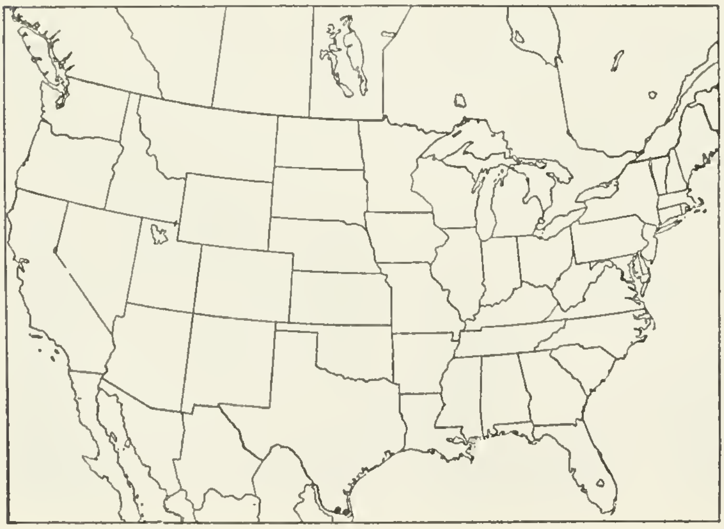


Figure 223.—Localities for *Polycyrtidea limitis*.

flavopicta from Grenada, Venezuela, British Guiana, and southern Brazil. Collections from intervening localities may show the two to be only subspecifically distinct.

Specimens: ♂, ♀, Brownsville, Tex., August 1945, Shiler and Moreland (Washington). ♀, Hidalgo Co., Tex., July 30, 1928, R. H. Beamer (Lawrence). ♂, San José, Costa Rica, 1928, M. Valeris (Washington). ♀, Costa Rica, 1920, Paul Serre (Townes). ♀, Mexico, Aug. 30, 1950, D. J. Smith (Washington).

This species ranges from near Brownsville, Tex., to Costa Rica.

24. Genus Listrognathus

FIGURE 320,a

Front wing 4.8 to 13.5 mm. long; body moderately stout; frons with a median horn that is pyramidal or conical, the horn sometimes with a short dorsal accessory horn or tine; clypeus rather small, moderately to strongly convex, its apical 0.35± usually abruptly declivous so that clypeus appears pyramidal in profile, the apical margin of clypeus evenly convex or subtruncate, without a median point; mesoscutum weakly convex, polished or subpolished, with coarse punctures; notaulus varying from sharp to indistinct, usually reaching to center of mesoscutum and sometimes beyond; epomia very strong, ending dorsally on an angulate projection in upper margin of pronotum; propodeum strongly convex, its basal carina sharp and complete, its apical carina varying from complete and sharp with more or less distinct sublateral cristae to absent except for strong sublateral teeth or tubercles; propodeal spiracle short elliptic to elongate; areolet very small, quadrangular, square, trapezoidal, or a little higher than wide, the second intercubitus weak; ramellus absent; nervulus basad of basal vein by about 0.3 its length; second discoidal cell broad at base; mediella weakly arched; nervellus broken near its lower end; axillus varying from very close to anal margin to moderately separated from it; first abdominal segment rather stout, the spiracle far behind the middle and postpetiole strongly expanded, with a strong subbasal lateral tooth, its ventrolateral carina strong and either complete or obsolete basally, its dorsolateral carina blunt, usually distinct near apex of postpetiole, sometimes sharp and distinct on petiole, its median dorsal carinae blunt and vestigial or sometimes sharp on apical part of petiole and basal part of postpetiole; second tergite polished or subpolished, with strong coarse punctures that are moderately close to crowded; tergite 7 without a median white spot but often margined with yellow and sometimes most of the tergite white; ovipositor sheath about 0.32 as long as front wing; ovipositor stout, subcylindric, its apex various, as in figure 329,i-n.

The genus *Listrognathus* is probably almost worldwide. Most of the species are Holarctic and Indo-Australian. It is divisible into four subgenera, as keyed and described below.

Key to the subgenera of Listrognathus

1. Thyridium narrow, about 0.8 as wide as its distance from base of second tergite; clypeus in profile moderately convex, not sharply pyramidal; lower end of occipital carina moderately incurved, joining hypostomal carina at an acute angle; apical transverse carina of propodeum not interrupted medially. Nearctic. . . . . **1. Fenestula,** new subgenus

   Thyridium wide, about 1.3 to 2.5 as wide as its distance from base of second tergite; clypeus pyramidal in profile. 2

2. Lower end of occipital carina curved sharply toward the hypostomal carina or more or less recurved, joining hypostomal carina at a right angle or recurved and more or less interrupted at hypostomal carina, the hypostomal carina very high; shoulders on upper edge of pronotum moderately strong, usually obtuse; second tergite usually with a yellow or white apical band. Holarctic and Oriental . . . . **4. Listrognathus**

   Lower end of occipital carina curved rather weakly toward hypostomal carina, which it meets at an acute angle; shoulders on upper edge of pronotum very strong, usually acute; second tergite usually with an interrupted yellow or white apical band or a pair of lateral spots. 3

3. Lower lateral edge of first abdominal tergite without teeth; postpetiole moderately wide to very wide. Indo-Australian . . . . **2. Suvalta**

   Lower lateral edge of first abdominal tergite with one or two strong teeth near its midlength; postpetiole very wide. Indo-Australian . **3. Stivadens**

1. Fenestula, new subgenus

Front wing 5.4 to 8.0 mm. long; clypeus moderately convex, in profile not pyramidal or with only a trace of a median point; lower end of occipital carina moderately incurved, joining hypostomal carina at an acute angle, not recurved or interrupted; hypostomal carina not unusually high; shoulders on upper edge of pronotum moderately strong, obtuse; apical transverse carina of propodeum not interrupted medially, forming only weak apophyses; lower edge of first tergite simple; thyridium narrower than its distance from base of second tergite; upper valve of ovipositor beyond nodus not strongly depressed.

The subgeneric name is from Latin *fenestra* (window) plus *ula* (diminutive), in allusion to the small thyridium.

Genotype: *Mesostenus paludatus* Cresson, 1872.

This subgenus includes one widespread Nearctic species.

1. Listrognathus (Fenestula) paludata (Cresson)

FIGURE 329,i

Front wing 5.4 to 8.0 mm. long; propodeum almost horizontal basad of its apical carina, abruptly declivous at its apical carina;

punctures on second tergite coarse, separated by about 0.6± their diameter; ovipositor tip as in figure 329,i.

This species is transcontinental in the Canadian, Transition, and Upper Austral zones. It is divisible into three subspecies that are distinguishable on color, as keyed and described below.

1. Mesoscutum entirely black; hind femur ferruginous with its apex usually black; range: United States and Canada except for California and Arizona.
1a. paludata paludata (Cresson)
Mesoscutum largely or entirely ferruginous; hind femur entirely ferruginous, its apex not black 2
2. Temple ferruginous to fuscous, not marked with ivory; range: California.
1b. paludata californica, new subspecies
Temple ferruginous, ivory next to eye; range: southern Arizona.
1c. paludata ocularis, new subspecies

1a. Listrognathus (Fenestula) paludata paludata (Cresson)

FIGURE 334,e

Mesostenus paludatus Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 162; ♂. Type: ♂, Comal Co., Tex. (Philadelphia).

Listrognathus agnatus Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 21; ♀. Type: ♀, southern Illinois (Washington).

Male: Black, the thorax and abdomen often more or less fulvous. Face, frontal orbit, more or less of frontal horn, clypeus, cheek, mouth parts, under half of scape, more or less of propleurum, stripe on lower edge of pronotum, wider stripe on upper edge of pronotum, tegula, subtegular ridge, spot of variable size on lower part of mesopleurum, spot on scutellum, sometimes mesosternum next to sternaulus, broad vertical stripe of variable size beneath propodeal apophysis, front and middle coxae and trochanters, sometimes apical ventral mark on hind coxa, and second through fourth segments of hind tarsus, ivory white, the bases of front and middle coxae and their second trochanters often tinged with fulvous; flagellum fulvous beneath; front and middle tibiae and tarsi pale fulvous, their tarsi white with the fifth segments brown; hind coxa, trochanters, and femur fulvous, the apex of femur black; hind tibia fulvous, its basal 0.1± and apical 0.4± fuscous; first and last segments of hind tarsus black, the rest white; ground color of thorax and abdomen varying from entirely black to largely fulvous, the ground color of pronotum, mesonotum, and tergites beyond the fourth being always black.

Female: Black, the thorax and abdomen often more or less fulvous. Stripe on frontal orbit, sometimes facial orbit, rarely short stripe on hind orbit ventrally, often the apex of frontal horn, rarely most of clypeus, rarely most of mouth parts, band occupying about 4.5 segments of flagellum (but incomplete below), stripe on upper edge of pronotum, tegula, usually subtegular ridge, usually a spot on scutellum, sometimes a blotch on lower part of mesopleurum, often a stripe of variable size and distinctness below the propodeal apophysis, and third through fourth segments of hind tarsus, white, the fourth segment sometimes partly or entirely brown; front and middle legs fulvous, their fifth segments brown; hind coxa, trochanters, and femur fulvous, the apex of femur black; hind tibia blackish, its subbasal part brownish; first and last segments of hind tarsus black; ground color of thorax and abdomen black or more or less fulvous, the pronotum, mesonotum, and abdomen beyond fourth tergite always black.

This subspecies is quite variable and possibly should be subdivided. Specimens from more southern localities tend to have more extensive white markings; those from the Rocky Mountain area tend to be largely fulvous in ground color; and those from British Columbia, Oregon, and New Mexico tend to have the fuscous at apex of hind femur reduced, sometimes practically lacking.

Specimens: ♀, Mount McKinley at 1,600 ft., Alaska, Aug. 10, 1954, D. Townes (Townes). 2♀, Robson, B.C., July 9, 1949, and Aug. 3, 1949, H. R. Foxlee (Ottawa). ♀, Fort Collins, Colo., July 29, 1902, L. A. Titus (Ithaca). ♀, Lyons, Colo., June 14, 1948, H., M., G., and D. Townes (Townes). 2♂, 10♀, reared from *Harpyia cinaria*, Aweme, Man., Aug. 14, 1907, N. Criddle (Ottawa and Washington). 15♀, reared from *Harpyia* sp., Aweme, Man., Apr. 30, 1909, N. Criddle (Ottawa, Washington, and Townes). ♀, Ann Arbor, Mich., July 5, 1959, H. and M. Townes (Townes). ♀, Antrim Co., Mich., July 4, 1959, R. and K. Dreisbach (Dreisbach). ♀, Midland Co., Mich., Sept. 9, 1944, R. R. Dreisbach (Townes). ♂, Olmsted Co., Minn., C. N. Ainslie (Washington). ♀, Taos, N. Mex., June 22, 1949, D. G. Denning (Townes). 2♀, West Farms, New York, N.Y., J. Angus (New York). 2♀, Montgomery Co., Ohio, Aug. 18, 1943, F. D. De Gant (Columbus). ♀, Lick Creek Ranger Station, Wallowa National Forest, 4,600 ft., Oreg., Aug. 12, 1937, Bolinger and Jewett (Washington). ♀, in light trap, Platt Co., Wyo., Aug. 12, 1949, D. G. Denning (Townes). 2♀, Burwash Landing, Yukon, July 27, 1948, Mason and Hughes (Ottawa).

This subspecies occurs in the Canadian and Transition zones, ranging from the Atlantic Ocean to western Oregon and Washington, and northward to Alaska.

1b. Listrognathus (Fenestula) paludata californica, new subspecies

FIGURE 334,f

Male: Ground color of thorax and abdomen ferruginous, the abdomen beyond fifth or sixth tergites black; ground color of head black, or more or less ferruginous; lower part of mesopleurum sometimes with a small white area; hind femur entirely ferruginous. Coloration otherwise as in male of the subspecies *paludata*.

Female: Ferruginous, the head often more or less blackish, the frons usually black; frontal and facial orbits, usually the frontal horn, dorsal stripe on flagellum covering about 3 segments, upper margin of pronotum, tegula, subtegular ridge, apex of scutellum, rarely a vertical stripe beneath propodeal apophysis, and second and third segments of hind tarsus white or whitish, the third segment of hind tarsus and part of second segment usually partly ferruginous and the other white markings often obscure, reduced, or sometimes absent; scape and flagellum fuscous except for the short white stripe of flagellum; upper part of pronotum and sutural areas of mesoscutum sometimes infuscate; hind femur not darkened at apex; hind tibia ferruginous, its apical 0.4± infuscate; first segment of hind tarsus black; fourth segment of hind tarsus brown, usually whitish basally; fifth segments of all tarsi dark brown.

Type: ♀, La Mesa, Calif., reared with four other females as gregarious parasites of a tough, elongate lepidopterous cocoon, Apr. 18, 1959, F. Yaruss (Washington, USNM 63821).

Paratypes: 4♀, same data as type (Townes and Timberlake). ♀, Hallelujah Junction, Lassen Co., Calif., July 17, 1953, E. I. Schlinger (Townes). ♂, Mojave River, Apple Valley, Calif., June 29, 1940, J. W. MacSwain (Berkeley). ♀, Olivehain, San Diego Co., Calif., Aug. 31, 1955, R. K. Washino (Davis). ♂, ♀, Poway, Calif., September 1884 and no date, F. E. Blaisdell (San Francisco). ♀, 4 miles west of Quincy, Calif., June 20, 1949, E. I. Schlinger (Townes). ♀, reared from lepidopteran on *Salix*, Santa Ana, Calif., 1928, C. M. Dammer (Washington). ♀, Sierraville, Calif., July 14, 1958, R. M. Bohart (Davis). ♂, 3♀, Calif. (New York).

This subspecies is restricted to California.

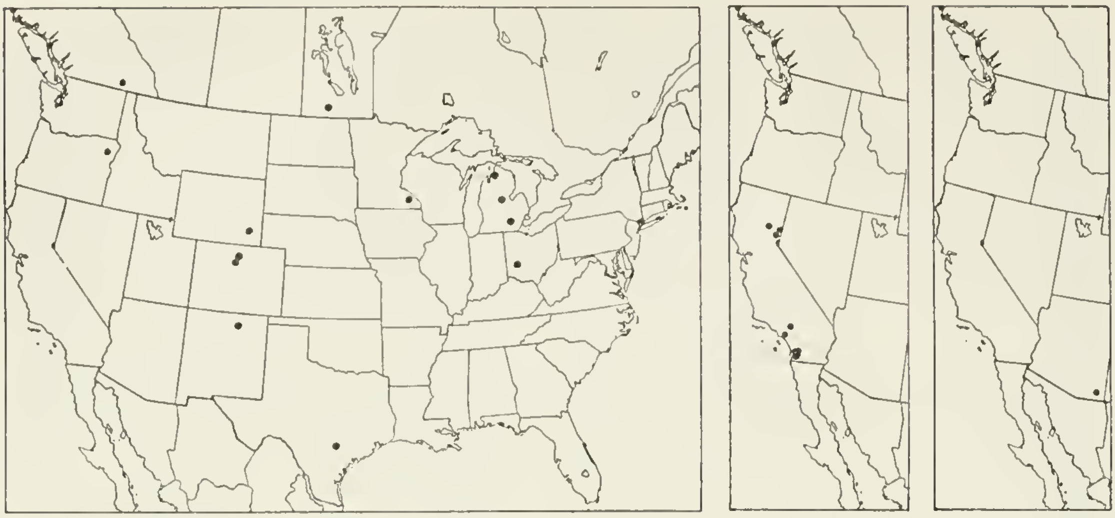
1c. Listrognathus (Fenestula) paludata ocularis, new subspecies

Figure 334,g

Male: Unknown.

Female type: Fulvoferruginous. Moderately wide orbit (complete) frontal horn, most of clypeus, four median flagellar segments except below, mouth parts, stripes on upper and lower margins of pronotum, tegula, subtegular ridge, most of scutellum, vertical stripe beneath propodeal apophysis, and second through fourth segments of hind tarsus, ivory white; apical 0.3 of hind tibia infuscate; fifth segments of all tarsi dark brown.

Type: ♀, Chiricahua Mts., Ariz., July 4, 1940, D. E. Hardy (Lawrence).



Figures 224–226.—Localities: 224 (left), *Listrognathus paludata paludata;* 225 (center), *L. p. californica;* 226 (right), *L. p. ocularis.*

2. Subgenus Suvalta

Suvalta Cameron, 1903, Zeitschr. Syst. Hymen. Dipt., vol. 3, p. 301. Type: *Suvalta rugifrons* Cameron; designated by Viereck, 1914.

Front wing 6 to 10 mm. long; clypeus sharply elevated medially, pyramidal in profile; lower end of occipital carina moderately incurved, joining hypostomal carina at an acute angle, not recurved or interrupted; hypostomal carina not unusually high; shoulders on upper edge of pronotum very strong, usually acute; apical transverse carina of propodeum forming rather strong sublateral crests, usually interrupted medially; lower edge of first tergite simple; thyridium wider than its distance from base of second tergite; upper valve of ovipositor usually depressed between nodus and apex.

This subgenus occurs in the Indo-Australian area. The following described species belong here: *Cryptus mobilis* Tosquinet 1903, *Suvalta laevifrons* Cameron 1903, *S. pallidinerva* Cameron 1904, *S. rugifrons* Cameron 1903, and *S. spinifrons* Cameron 1905. *Cryptus serius* Tosquinet 1903 is a synonym of *Listrognathus mobilis.*

3. Subgenus Stivadens

Stivadens Townes, 1961, *in* Townes, Townes, and Gupta, A catalogue and reclassification of the Indo-Australian Ichneumonidae, p. 472. Type: *Suvalta annulipes* Cameron; original designation.

Front wing 9.0 to 12.5 mm. long; similar in general to *Suvalta* but stouter and broader in build, with one or two strong teeth near midlength of carina on lower margin of first tergite, and upper valve of ovipositor beyond nodus rather broad and flat and with weak cross ridges.

This subgenus is of Indo-Australian distribution. There are only two described species, the genotype and *Suvalta transversa* Cameron 1912.

4. Subgenus Listrognathus

FIGURE 320,a

Listrognathus Tschek, 1870, Verh. Zool.-Bot. Gesell Wien, vol. 20, p. 153. Type: *Listrognathus cornutus* Tschek; monobasic.

Mesostenoideus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 45. Type: *Mesostenus albomaculatus* Cresson; original designation.

Front wing 4.7 to 12.5 mm. long; clypeus sharply elevated medially, pyramidal in profile; lower end of occipital carina curved sharply toward hypostomal carina and usually more or less recurved, weak or interrupted next to hypostomal carina, the hypostomal carina very high; shoulders on upper edge of pronotum moderately strong, usually obtuse; apical transverse carina of propodeum forming moderately strong crests, weaker medially and sometimes interrupted medially; thyridium wider than its distance from base of second tergite; upper valve of ovipositor beyond nodus more or less flattened.

This subgenus is Holarctic, Oriental, and Neotropic. There are 11 Nearctic species. Besides these we assign the following to the subgenus: *Vagenatha armata* Cameron 1905, *Listrognathus eccopteromus* Uchida 1930, *L. coreensis* Uchida 1930, *L. sauteri* Uchida 1932, *L. cornuta* Tschek 1870, and *Ichneumon mactator* Thunberg 1822. Some unnamed species and certainly some additional ones with names belong here also, but they cannot be placed from literature, and specimens are not available.

Some of the Nearctic "species" seem to be identical or very closely similar in structure, and in these cases it is not certain whether we are dealing with species, subspecies, or sometimes varieties. For the present we have recognized most of the reasonable segregates as species. Discovery of more structural characters of taxonomic value, or further collecting should show their relationships more clearly.

Key to the Nearctic species of the subgenus Listrognathus

1. Third tergite fulvous, ferruginous, or mostly ferruginous, without an apical white band 2
   Third tergite black, usually with an apical white band 5
2. Thorax mostly or entirely fulvous or ferruginous. 3
   Thorax mostly or entirely black 4
3. Thorax with whitish markings on scutellum, upper margin of pronotum, propodeum, etc. **6. rufa,** new species
   Thorax without whitish markings, uniformly ferruginous. **11. acheloma,** new species

4. Coxae black; dorsal valve of ovipositor compressed between nodus and apex. **1. bicolor,** new species
Coxae fulvous; dorsal valve of ovipositor depressed between nodus and apex. **5. victoriensis** (Harrington)
5. Hind tibia uniformly fulvous except that its basal 0.1± is fuscous and sometimes its extreme apex is weakly infuscate 6
Hind tibia fuscous, with a subbasal whitish band 7
6. Apical 0.08± of hind femur fuscous; eye usually not completely surrounded with white, the white interrupted on upper part of temple; apex of upper valve of ovipositor not swollen (fig. 329,l). . . . **9. rufitibialis** Cushman
Apex of hind femur not fuscous; eye usually completely surrounded with white; apex of upper valve of ovipositor with an abrupt swelling (fig. 329,m). **10. glomerata,** new species
7. Metapleurum with a white spot; flattened subapical area on dorsal valve of ovipositor usually with a fine, indistinct median carina. **8. multimaculata** Cushman
Metapleurum entirely black; flattened subapical area on dorsal valve of ovipositor nearly always completely devoid of a median carina . . . 8
8. Hind coxa fulvous or mostly fulvous; apical 0.4± of hind femur blackish . 9
Hind coxa black, often with a white mark above; apical 0.2± of hind femur blackish 10
9. Upper side of hind coxa without a white spot; apical 0.4± of hind femur blackish . . . . **2. femorata,** new species
Upper side of hind coxa with a white spot; apical 0.1± of hind femur blackish. **3. nubilipennis** (Cresson)
10. Second and third tergites without white apical bands; hind coxa without a white mark above . . . . **4. nigrescens,** new species
Second and third tergites with apical white bands; hind coxa nearly always with a white mark above . . . . **7. albomaculata** (Cresson)

1. Listrognathus (Listrognathus) bicolor, new species

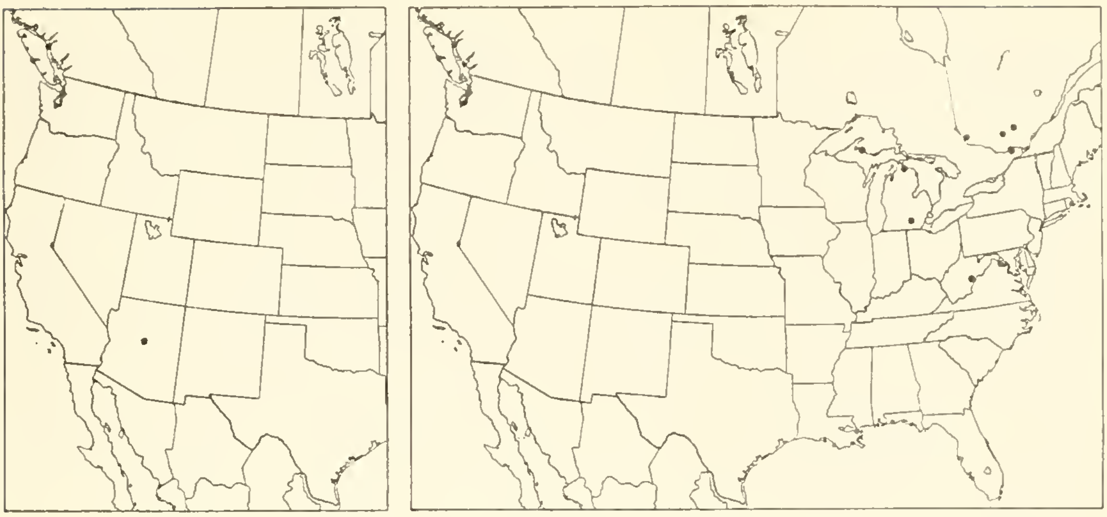
Figures 329,j; 335,a

Male: Unknown.

Female type: Front wing 6.0 mm. long; frontal horn rather short; propodeum with rather narrow long crests, between the crests with only a trace of the apical carina; postpetiole rather narrow, with scattered, rather sparse punctures; punctures on second tergite separated by about 0.8 their diameter; ovipositor tip evenly tapered from above and below, its dorsal valve rather narrow between nodus and apex, rounded above (fig. 329,j).

Black. Front orbit, spot on clypeus, base of tegula, and second through fourth segments of hind tarsus, white; flagellum brownish medially; apex and much of upper part of front and middle femora and front and middle tibiae fulvous brown; front and middle tarsi medium brown; abdomen and hind femur uniformly ferruginous; hind tibia brown, its extreme base darker; hind basitarsus brown, its apex pale brown; fifth segment of hind tarsus dark brown.

Type: ♀, Oak Creek Canyon, Ariz., May 19, 1947, H. and M. Townes (Washington, USNM 63822).



FIGURES 227, 228.—Localities: 227 (left), *Listrognathus bicolor;* 228 (right), *L. femorata.*

2. Listrognathus (Listrognathus) femorata, new species

FIGURE 335,b

Front wing 6.5 to 7.2 mm. long; frontal horn of moderate size in male, very small in female; propodeum with rather wide short crests, the apical carina between the crests strong in male, moderately strong in female; postpetiole of moderate width, its punctures close laterally, somewhat sparser medially; punctures of second tergite close, separated by about 2.5 their diameter; ovipositor tip as in *L. albomaculata.*

Male: Black. Face, frontal orbit, clypeus, cheek, lower part of temporal orbit, mouth parts, front of scape, tegula, and markings on thorax and abdomen as illustrated for female (fig. 335,b), white; flagellum brown beneath, with a median white stripe above; front and apex of front and middle coxae white, the rest brown or fulvous; front and middle trochanters white, more or less brown or fulvous above; front and middle femora and tibiae fulvous, the tibiae with a whitish basal band; front and middle tarsi whitish, their last segment brown; hind coxa ferruginous or sometimes partly infuscate, rarely with a small whitish area above; hind trochanters and femur ferruginous, the apical 0.25 to 0.6 of the femur infuscate or black; hind tibia black with a subbasal white ring; hind basitarsus black, its basal 0.15± and apical 0.3± white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black; ground color of first abdominal segment varying from black to fuscoferruginous; second tergite often with a ferruginous tinge basally.

Female: Black. Frontal and facial orbits, spot on clypeus and on mandible, flagellar band covering about 5 segments (but incomplete below), tegula, and markings on thorax and abdomen as in figure 335,b, white; palpi fuscous and whitish; front and middle coxae white in front, the rest fulvous or brownish fulvous; hind coxa fulvous; trochanters fulvous, the front ones often paler below and darker above; front and middle femora and tibiae fulvous, the tibiae weakly infuscate above; front and middle tarsi fuscofulvous, their first segment darker and last segment brown; hind femur fulvoferruginous, its apical 0.25 to 0.6 black or fuscous; hind basitarsus black, narrowly white at base, its apex sometimes white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black; front wing often with a faint median infuscation; ground color of first abdominal segment ferruginous, sometimes partly infuscate; second tergite often stained with fulvous or ferruginous. The white markings on head and body are often smaller than described and figured.

Type: ♀, Cheboygan Co., Mich., July 25, 1947, R. R. Dreisbach (Dreisbach).

Paratypes: ♂, Ann Arbor, Mich., May 4, 1959, H. and M. Townes (Townes). 4♂, collected on *Alnus* at edges of sedgy meadows, July 25, 26, 27, and 29, 1959, Huron Mts., Marquette Co., Mich., H. Townes (Townes). 2♀, from sand pits, Ottawa, Ont., June 28, 1940, Ed. G. Lester (Ottawa). ♂, Alberton, P. E. I., July 15, 1940, G. S. Walley (Ottawa). ♀, Gracefield, Que., June 25, 1937, F. A. Urquhart (Ottawa). ♂, Laniel, Que., June 4, 1944, A. R. Brooks (Ottawa). 3♂, Montigny, Que., June 11, 1941, O. Peck and G. S. Walley (Ottawa). ♂, Falls Church, Va., May 17, N. Banks (Cambridge). ♂, Vienna, Va., Apr. 22, 1913, R. A. Cushman (Washington). ♀, Cheat Mt., 2,000 ft., Randolph Co., W. Va., June (Pittsburgh).

This species occurs in northeastern United States and southeastern Canada.

3. Listrognathus (Listrognathus) nubilipennis (Cresson)

Mesostenus nubilipennis Cresson, 1878, Canadian Ent., vol. 10, p. 205; ♀. Type: ♀, Georgia (Philadelphia).

Male: Unknown.

Female: Front wing 6.5 mm. long. Similar in general to the female of *L. femorata* except that hind coxa has a white spot on its upper side, hind femur is ferruginous with its tip fuscous, and front wing has a more distinct median infuscation.

Known only from the type, a female from Georgia.

4. Listrognathus (Listrognathus) nigrescens, new species

Figure 335,c

Front wing 5.5 to 8.0 mm. long; frontal horn medium sized; propodeum with moderately prominent crests, its apical carina between the crests rather weak in male, obsolescent in female; postpetiole moderately wide, with moderately dense, evenly distributed punctures; punctures on second tergite separated by about 0.3 their diameter; ovipositor tip as in *L. albomaculata* (fig. 329,k).

Male: Black. Often the frontal and facial orbits, sometimes median area on face, sometimes clypeus and mouth parts, sometimes spot on lower part of temporal orbit, sometimes spot on upper end of epomia, sometimes subtegular ridge, sometimes spot on scutellum, and median part of apical margin of tergites 4–6 and sometimes of tergite 7, white; palpi brown, white, or partly white; flagellum entirely black; tegula black or brown, usually white at base; front and middle coxae and first trochanters sometimes white beneath, the first trochanters of all legs otherwise light brown to black; second trochanters and femora fulvoferruginous, the apical 0.1 of hind femur fuscous; front and middle tibiae fulvous; front and middle tarsi brown, the last segment blackish; hind tibia black, with a subbasal whitish or light brown band; hind basitarsus black, sometimes its base and sometimes its apex white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black; wings sometimes lightly infuscate; apical margin of tergites 2 and 3 with a ferruginous tinge.

Female: Black. Narrow stripe on frontal orbit, band on flagellum covering 4.5 segments (but incomplete below), spot on upper end of notaulus, small spot on scutellum, and narrow incomplete apical margins of tergites 3–7 white or whitish; palpi brown; tegula brown, paler at base; front and middle legs beyond coxae fulvous, the last segment of their tarsi brown; hind trochanters and femur fulvous, the apical 0.12 of the femur fuscous; hind tibia black, with a subbasal whitish band; first and last segment of hind tarsus black, the first segment whitish at base; segments 2–4 of hind tarsus white; wings faintly infuscate; apical margin of second tergite with a ferruginous tinge. See figure 335,c for other details.

Type: ♀, Waterton Park, Alta., July 12, 1923, E. H. Strickland (Ottawa).

Paratypes: ♂, Cloudcroft, N. Mex., June 27, 1940, E. E. Kenaga (Lawrence). ♂, Strawberry Daniel Pass, Utah, June 19, 1948, H., M., G., and D. Townes (Townes). ♂, Grand Teton National Park, Wyo., July 1947, R. M. Bohart (Townes).

This species occurs in the Rocky Mountain area, from Alberta to New Mexico.

5. Listrognathus (Listrognathus) victoriensis (Harrington)

FIGURES 335,d,e

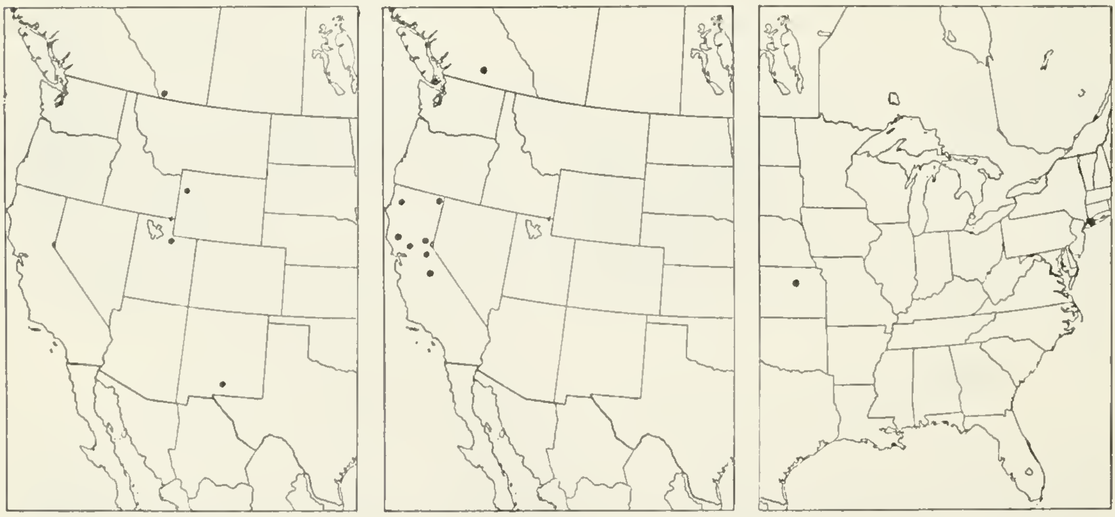
Cryptus victoriensis Harrington, 1894, Canadian Ent., vol. 26, p. 211; ♀. Lectotype (hereby designated): ♀ (labeled lectotype by Townes in 1960), Victoria, B.C (Ottawa).

Listrognathus multicolor Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 20; ♀. Type: ♀, California (Washington).

Front wing 5.2 to 7.6 mm. long; frontal horn large; propodeum with rather low crests, its apical carina absent or present between the crests in male, absent in female; postpetiole moderately wide, with moderately close, evenly distributed punctures; punctures on second tergite separated by about 0.25 their diameter; ovipositor tip as in *L. albomaculata* (fig. 329,k).

Male: Head and body marked with black, white, and ferruginous as in female (figs. 335,d,e) except that face and clypeus are often entirely white, white area on lower part of temple larger, front of scape white, abdomen often more or less infuscate, and white markings on abdomen usually less extensive. Flagellum entirely black; coxae varying from fulvous to blackish, the front and middle coxae usually more or less extensively white in front; first trochanters fulvous to brown, those of the front and middle legs often white below; front and middle legs beyond first trochanters fulvous, their tibiae with an obscure whitish basal band and their fifth segment dark brown; hind second trochanter and femur fulvous, the femur sometimes with its extreme apex infuscate; hind tibia fuscous, with a subbasal white band; first and fifth segments of hind tarsus fuscous, whitish at base; hind tarsal segments 2–4 white.

Female: Head and body black, white, and ferruginous as in figure 335,d or 335,e; antenna black, with a median white stripe above that covers two segments; front and middle legs and hind coxa, trochanters, and femur fulvoferruginous, their fifth segments brownish ferruginous; hind tibia brownish, with a paler band subbasally; hind tarsus dark brown, the second through fourth segments light brown varied with whitish.



Figures 229–231.—Localities: 229 (left), *Listrognathus nigrescens;* 230 (center), *L. victoriensis;* 231 (right), *L. rufa.*

Specimens: ♀, Vernon, B.C., June 21, 1917, M. H. Ruhman (Ottawa). ♂, Brockway, Calif., July 1941, G. E. Bohart (Townes). 2♂, Camino, Calif., June 26 and 29, 1948, H., M., G., and D. Townes (Townes). ♂, Coffee Creek, Trinity Co., Calif., June 7, 1934 (Townes). ♂, Davis, Calif., June 6, 1950, A. T. McClay (Townes). ♂, Davis Creek, Modoc Co., Calif., July 12, 1922, C. L. Fox (San Francisco). ♂, Fish Camp, Calif., July 11, 1948, H., M., G., and D. Townes (Townes). ♀, Hopland, Calif., May 9, 1926, E. P. Van Duzee (Townes).

This species ranges from southern British Columbia to central California.

6. Listrognathus (Listrognathus) rufa, new species

Figure 335,f

Male: Front wing 6.2 to 6.4 mm. long; frontal horn rather small; propodeum with weak crests, the apical carina strong between the crests; postpetiole moderately wide, its punctures moderately close laterally and apically, elsewhere sparser; punctures on second tergite mostly crowded.

Fulvous. Head and body marked with whitish as in figure 335,f, the frons and vertex somewhat infuscate except for the whitish orbits; scape brown, white in front, the rest of antenna blackish, brown beneath; mouth parts white; front and middle legs fulvous, the front of coxae, underside of trochanters, and tibiae basally whitish, the tarsi whitish fulvous with their fifth segments brown; hind coxa, trochanters, and femur fulvous, the apical 0.06 of the femur infuscate; hind tibia fuscous with a white subbasal band; first and last segments of hind tarsus fuscous, whitish at base, the apical 0.2± of the first segment also white; segments 2–4 of hind tarsus white.

Female: Unknown.

Type: ♂, swept from *Solidago*, Riley Co., Kans., September 28, J. B. Norton (Washington, USNM 63823).

Paratype: ♂, Huntington, N.Y., May 31, 1936, F. M. Schott (Washington).

7. Listrognathus (Listrognathus) albomaculata (Cresson)

Figure 329,k

Front wing 6.2 to 7.8 mm. long; frontal horn small; propodeum with moderately strong crests, its apical carina between the crests not strong but usually present and complete, sometimes obsolescent; postpetiole moderately wide, its punctures rather close apicolaterally, elsewhere sparser; punctures on second tergite separated by about 0.3 their diameter; ovipositor tip as in figure 329,k, the subapical flattened part of its upper valve a very little narrower than in *L. multimaculata* and without a median longitudinal ridge.

Head, body, and hind coxa black, marked with white about as in figure 335,g or 336,a, or intermediate between these two figures, the face of male being entirely white. Front of male scape, upper side of the median 11± segments of male flagellum, and upper side of the median 6± segments of female flagellum, white; antenna otherwise black except that under side of male flagellum is brown, paler medially; palpi white; front and middle coxae brown or sometimes fulvous, more or less white according to sex and subspecies, sometimes entirely white, the white more extensive in males and in the subspecies *albomaculata*; hind coxa black, with a large white spot above in the subspecies *albomaculata*, the white spot smaller or absent in the subspecies *sagax*; hind trochanters and femur fulvous, the apical 0.2± to 0.5± of the femur fuscous, the fuscous area averaging more extensive in males; hind tibia black with a subbasal white band; first segment of hind tarsus varying from fuscous with a narrow basal and wider apical white band, to entirely white; segments 2–4 of hind tarsus white; segment 5 of hind tarsus black, its base often white. Specimens from the western edge of the range (Alberta, Missouri, and Kansas) have the apical fuscous area on the hind femur reduced. In these it occupies only about the apical 0.1 and is not very dark.

There is a northern and a southern subspecies, differing in the extent of white markings, as defined below. Females can be distinguished rather sharply, but males of the two subspecies are not distinguishable with certainty.

1. Mesopleurum of female without a white spot above sternaulus; white markings on head, body, and coxae less extensive; range: Atlantic to Rocky Mts. in Canadian and Transition zones . . **7a. albomaculata sagax** (Provancher)
   Mesopleurum of female with a white spot above sternaulus; white markings on head, body, and coxae more extensive; range: Alleghanian, Carolinian, and Austroriparian faunas . . **7b. albomaculata albomaculata** (Cresson)

7a. Listrognathus (Listrognathus) albomaculata sagax (Provancher)

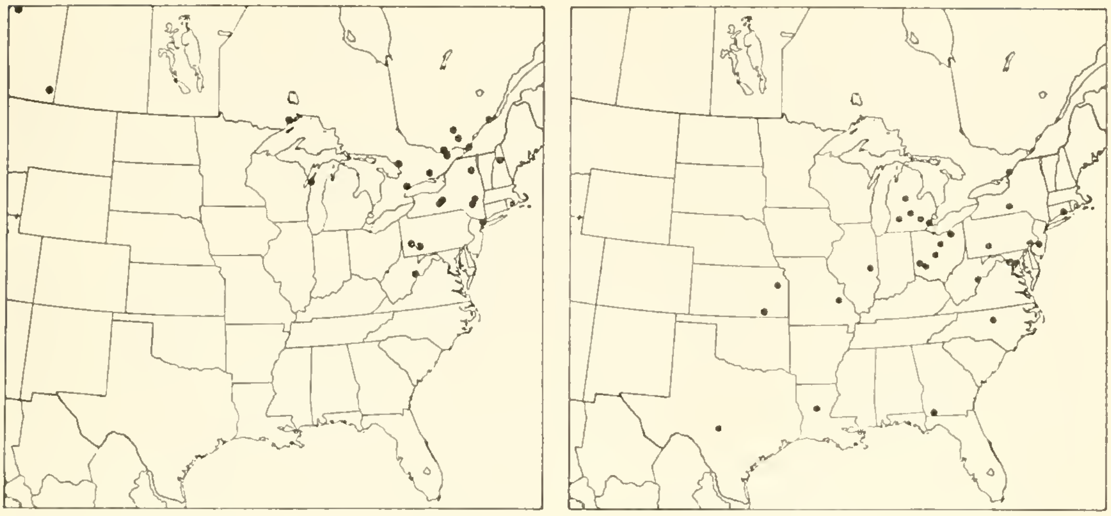
Figure 335,g

Mesostenus sagax Provancher, 1879, Naturaliste Canadien, vol. 11, p. 112 (Faune, p. 345); ♀. Type: ♀, Cap Rouge, Quebec (Quebec).

Male: Similar to the male of *L. albomaculata albomaculata* but with white markings averaging a little smaller.

Female: Head and body marked with white approximately as in figure 335,g, the mesopleurum without a white spot above sternaulus. Front wing usually with a faint infuscation medially.

Specimens (1♂, 29♀): From Alberta (Edmonton and Medicine Hat); New Brunswick (Jacquet River); New Hampshire (Mount Washing-



Figures 232, 233.—Localities: 232 (left), *Listrognathus albomaculata sagax;* 233 (right), *L. a. albomaculata.*

ton); New York (Connecticut Hill in Tompkins Co., Greene Co., Mount Skylight in Essex Co. at 4,800 to 4,920 ft., Oliverea in the Catskills, West Farms in New York City, and Wild Flower Preserve at Slaterville [Springs]); Ontario (Georgetown, Ottawa, Thunder Bay Beach, Tweed, and Waubamick); Pennsylvania (Pittsburgh and Westmoreland Co.); Quebec (Aylmer, Montreal, Nominingue, and Sainte-Agathe-des-Monts); West Virginia (Cheat Mt. at 2,000 ft. in Randolph Co.); and Wisconsin (Door Co.).

Collection dates are distributed through the summer, the earliest and latest dates being: June 5 at Edmonton, Alta., and at Thunder Bay Beach, Ont.; June 7 at Pittsburgh, Pa.; August 31 at Georgetown, Ont.; and September 3 to 8 at Oliverea, Catskill Mts., N.Y.

This subspecies ranges from the Atlantic Ocean to the Rocky Mountains, in the Canadian and Transition zones.

7b. Listrognathus (Listrognathus) albomaculata albomaculata (Cresson)

Figure 336,a

Mesostenus albomaculatus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 313; ♀. Type: ♀, Pennsylvania (Philadelphia).

Mesostenus leucocoxus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 407; ♂. Type: ♂, Cadet, Mo. (Washington).

Head and body marked with white approximately as in figure 336,a, the mesopleurum with at least a small white spot above sternaulus.

Specimens (15♂, 30♀): From Connecticut (Lyme); Georgia (Climax); Illinois (Urbana); Kansas (Lawrence and Montgomery Co. at 790 ft.); Louisiana (Winnfield); Maryland (Bowie, Cabin John, Glen Echo, and Plummers Island); Michigan (Ann Arbor, East Lansing, Grosse Ile in Wayne Co., Gull Lake Biological Station in Kalamazoo

Co., and Isabella Co.); Missouri (Cadet); New Jersey (Moorestown); New York (Ithaca); North Carolina (Wake Co.); Ohio (Bedford, Delaware Co., Greene Co., Montgomery Co., and Wooster); Ontario (Rockport); Pennsylvania (Castle Rock in Delaware Co. and Crisp in Westmoreland Co.); Texas (Kerrville); Virginia; and West Virginia (Cheat Mt. in Randolph Co. at 2,000 ft.).

Dates of collections are from late spring to late summer. The earliest and latest records are: April 21 at Kerrville, Tex.; May 18 at Lyme, Conn.; May 23 at Lawrence, Kans.; May 30 at Bowie, Md.; August 10 at Ithaca, N.Y.; and September 7 at Castle Rock, Delaware Co., Pa.

There is one reared specimen: ♀, from *Gretchena bolliana*, Climax, Ga., June 1958, M. A. Osborn.

This subspecies occurs in the Alleghanian, Carolinian, and Austroriparian faunas.

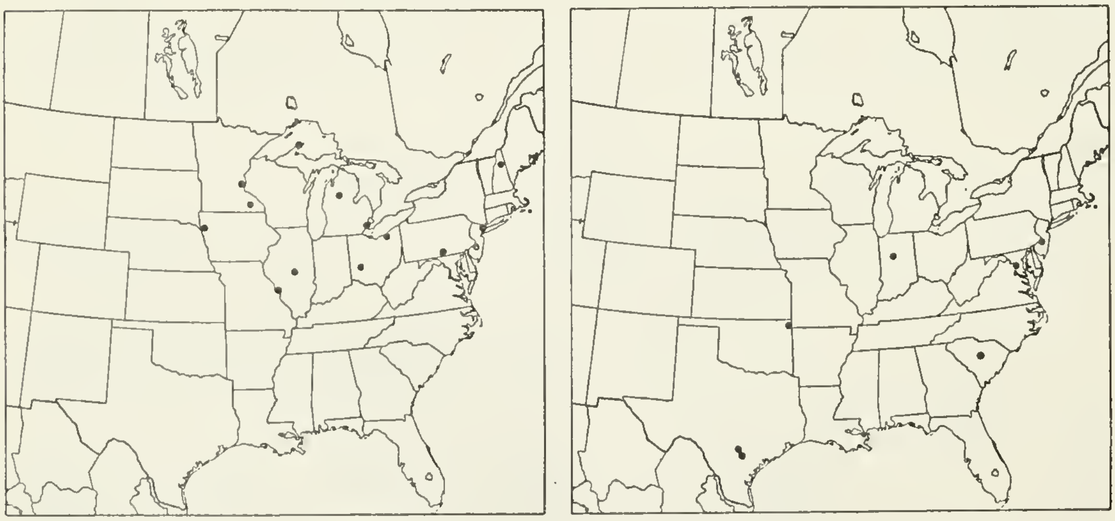
8. Listrognathus (Listrognathus) multimaculata Cushman, new status

Figure 336,b

Listrognathus albomaculatus var. *multimaculatus* Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 18; ♀. Type: ♀, Carlisle Junction, Pa. (Washington).

Front wing 7.8 to 9.0 mm long. Structurally similar to *L. albomaculata* except that frontal horn is larger, propodeal crests a little more prominent, apical carina of propodeum weaker between the crests (more often lacking), postpetiole a little wider and more evenly punctate, and subapical depressed area on dorsal valve of ovipositor a little wider and with a very weak, irregular, median carina.

Coloration (fig. 336,b) similar to that of *L. albomaculata albomacu-*



Figures 234, 235.—Localities: 234 (left), *Listrognathus multimaculata;* 235 (right), *L. rufitibialis.*

lata except that white markings tend to be a little larger, white area on lower part of mesopleurum is longer and more oblique, the metapleurum has a white spot, hind basitarsus is entirely white or with a small subbasal infuscation, and fuscous on apex of hind femur occupies only about 0.18 of its length.

Specimens: 2♀, reared from tortricid on *Gleditsia*, Decatur, Ill., Apr. 6, 1911, from Barnes collection (Washington). ♀, Sioux City, Iowa, May 1937, C. N. Ainslie (Washington). ♀, Brooksville, Maine, F. A. Eddy (Cambridge). ♀, Grosse Ile, Wayne Co , Mich., Aug. 10, 1937, George Steyskal (Townes). ♀, Keweenaw Co., Mich., Aug. 9, 1953, R. R. Dreisbach (Dreisbach). ♀, Missaukee Co., Mich., July 20, 1957, R. R. Dreisbach (Driesbach). ♀, Olmsted Co., Minn., C. N. Ainslie (Washington). ♀, St. Paul, Minn., Sept. 21, 1938, P. Schroder (St. Paul). ♀, St. Louis, Mo., Aug. 16, 1938 (Washington). ♂, 2♀, Mount Washington, N. H., A. T. Slosson (New York). ♀, Moorestown, N.J., July 9, 1930 (Ann Arbor). ♀, West Farms, New York, N.Y., J. Angus (New York). ♂, Cleveland, Ohio, July 7, 1935, F. D. De Gant (Columbus). 4♀, Montgomery Co., Ohio, July 16 and Aug. 21 and 28, 1943, F. D. De Gant (Columbus). 3♀, no data (Columbus and St. Paul).

This species occurs in northeastern United States.

9. Listrognathus (Listrognathus) rufitibialis Cushman

FIGURES 329,l; 336,c

Listrognathus albomaculatus var. *rufitibialis* Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 18; ♂, ♀. Type: ♀, Plummers Is., Md. (Washington).

Front wing 6.2 to 8.9 mm. long. Structurally similar to *L. albomaculata* except that propodeal crests are a little more prominent, apical carina of propodeum weaker between the crests (more often lacking), postpetiole a little wider and with more uniformly dense punctures, punctures on second tergite a little denser, and paired notches at nodus of ovipositor a little weaker.

Head, body, and hind coxa black, marked with white as in figure 336,c, the face of male entirely white. Front of male scape, upper side of the median 11± segments of male flagellum, band on median 6± segments of female flagellum (incomplete below), and palpi white; antenna blackish except where described as white, the under side of male flagellum light brown, paler medially; front and middle coxae brownish fulvous and white, mostly white; front and middle first trochanters fulvous, white below; front and middle legs beyond first trochanter fulvous, the male tibiae and tarsi pale fulvous or whitish, and the fifth segments of female tarsi brown; hind trochanter, femur, and tibia fulvous, the apical 0.08± of the femur and basal 0.12 of the tibia fuscous; apical 0.08± of hind tibia sometimes weakly infuscate;

hind basitarsus of male entirely white or fulvous to fulvous brown with the narrow base and broader apex white; segments 2–4 of hind tarsus of male white; segment 5 of hind tarsus of male white basally, fuscous apically; hind tarsus of female fulvous, the apex of first segment and all of segments 2–4 pale fulvous or whitish, the fifth segment brown.

Specimens: ♀, Lafayette, Ind., R. W. Thomas (Moscow). ♀, at light, Plummers Is., Md., July 15, 1911, P. R. Myers (Washington). 2♀, Plummers Is., Md., Sept. 20, 1914, and Sept. 29, 1912, P. R. Myers and R. C. Shannon (Washington). ♀, Moorestown, N.J., July 19, 1939, H. and M. Townes (Townes). ♂, Grove, Okla., June 5, 1934, J. Stankavich (Ottawa). 2♂, 3♀, Columbia, S.C., June 13 and 20, Aug. 2, and Sept. 21, all in 1951, G. and L. Townes (Townes). ♂, Salado Creek, Bexar Co., Tex., Mar. 21, 1952, M. Wasbauer (Berkeley). 19♂, San Antonio, Tex., Apr. 3 and 4, 1947, H. and M. Townes (Townes).

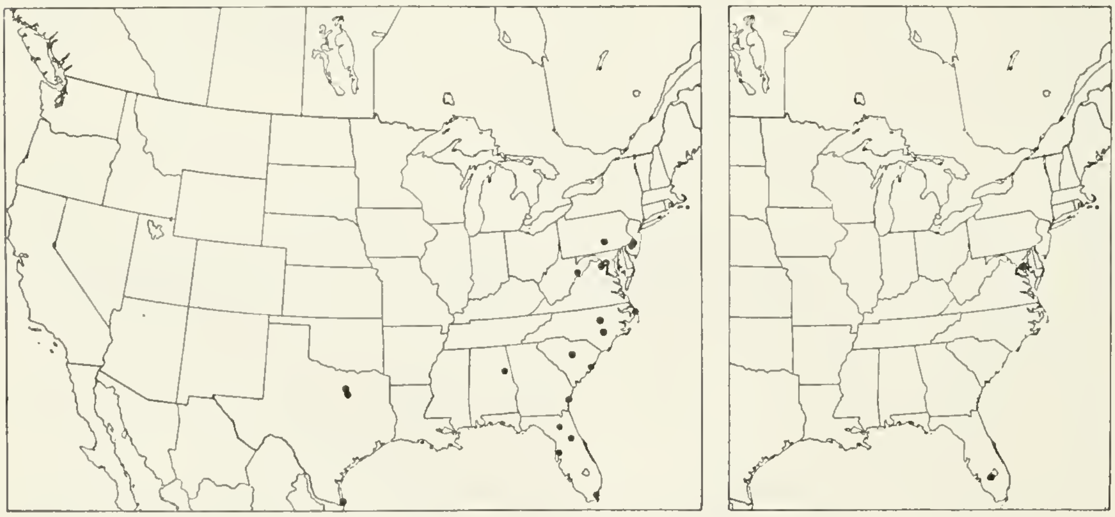
This species occurs in the Carolinian and Austroriparian faunas.

10. Listrognathus (Listrognathus) glomerata, new species

Figures 329,m; 336,d

Front wing 6.8 to 9.5 mm. long. Structurally similar to *L. rufitibialis* except that frontal horn averages larger and upper valve of ovipositor has an apical swelling (fig. 329,m).

Coloration similar to that of *L. rufitibialis* except that eye is usually completely surrounded with white, apex of hind femur is not fuscous, infuscation at base of hind tibia averages a little less extensive, and apex of hind tibia does not have a tendency to be infuscate. See figure 336,d.



Figures 236, 237.—Localities: 236 (left), *Listrognathus glomerata;* 237 (right), *L. acheloma.*

Type: ♀, McClellanville, S.C., May 16, 1944, H. and M. Townes (Washington, USNM 63824).

Paratypes (16♂, 18♀): From Alabama (Pyriton in Clay Co.); Florida (Alachua Co., Lake Co., Larkins in Dade Co., and Tarpon Springs); Georgia (St. Simons Island); Maryland (Takoma Park); New Jersey (Lucaston and Moorestown); North Carolina (Clinton, Kill Devil Hills, and Raleigh); Pennsylvania (Heckton Mills); South Carolina (Columbia and McClellanville); Texas (Cameron Co., Dallas Co., and Plano); Virginia (Falls Church); and West Virginia (Cheat Mt. in Randolph Co. at 2,000 ft.).

Collection dates are from late spring to mid-fall. The earliest and latest dates are: "March" at Larkins, Fla.; April 20, without locality; May 10, 12, 13, 16, and 18 at McClellanville, S.C.; May 21 at Heckton Mills, Pa.; September 18 at Falls Church, Va.; October 13 at Takoma Park, Md.; November 1 in Lake Co., Fla.; and December 12 at Tarpon Springs, Fla.

This species occurs in Carolinian, Austroriparian, and Tropical localities.

11. Listrognathus (Listrognathus) acheloma, new species

FIGURES 329,n; 336,e

Male: Unknown.

Female: Front wing about 6.0 mm. long; thorax a little more slender than usual for the genus; frontal horn small; propodeal crests low, the apical propodeal carina weak between the crests; postpetiole moderately wide, its punctures moderately close, sparser and weaker medially; punctures on second tergite separated by about 0.25 their diameter; ovipositor tip (fig. 329,n) as in *L. albomaculata* except that paired notches at nodus are lacking.

Ferruginous. Flagellum with a white band that covers 4.3 segments but is incomplete below, black distad of the band, fuscoferruginous basad of the band, fading to ferruginous basally; tegula ferruginous; fifth segments of front and middle tarsi light brown; hind tibia brownish ferruginous, with an indistinct stramineous subbasal band, fuscous basad of the band; hind tarsus brownish ferruginous, segments 2–4 a little paler, the base of segments 2 and 3 whitish, the fifth segment brown; most of exposed part of tergite 7 and sometimes narrow apical margin of tergite 6 white. See figure 336,e.

Type: ♀, taken while sweeping weeds, Hendry Co., Fla., Dec. 7, 1955, R. A. Morse (Washington, USNM 63825).

Paratype: ♀, Patuxent Research Refuge, Bowie, Md. (Patuxent Refuge collection).

25. Genus Cryptanura

FIGURE 320,b

Cryptanura Brullé, 1846, *In* Lepeletier, Histoire naturelle des insectes, hyménoptères, vol. 4, p. 242. Type: *Cryptanura nigripes* Brullé; designated by Viereck, 1914.

Polyaenus Cresson, 1873, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 149. Type: *Polyaenus ectypus* Cresson; designated by Viereck, 1914.

Polyaenidea Viereck, 1913, Proc. U.S. Nat. Mus., vol. 46, p. 381. Type: *Polyaenidea pretiosa* Viereck; original designation.

Front wing 6.6 to 17.5 mm. long; body of moderate proportions; frons with a median pair of conical or triangular horns, placed side by side, either entirely separate or arising from a common base (best seen from dorsal view); clypeus moderately large, rather evenly convex but flat or a little reflexed near apical margin and usually with a small, weak, median apical impression, its apex broadly truncate or subtruncate, often with a faint median lobe; epomia strong, rather long; mesoscutum moderately convex, polished or subpolished, its punctures coarse, strong, rather sparse to moderately dense; notaulus sharp, reaching beyond center of mesoscutum; propodeum strongly convex, its basal carina sharp, complete, its apical carina forming strong sublateral teeth, the rest of apical carina rather weak or absent; propodeal spiracle elongate; areolet rectangular, usually elongate, a little higher apically than basally; ramellus absent; nervellus basad of basal vein by about 0.25 its length; base of second discoidal cell broad; mediella weakly arched, its median portion almost straight; nervellus broken near its lower end; axillus long, moderately divergent from anal margin; first abdominal segment moderately stout, with a strong subbasal lateral tooth, its spiracle far beyond the middle and postpetiole rather strongly expanded, its sternite ending opposite or basad of spiracle, its petiole angled ventrolaterally and usually cornered by a distinct ventrolateral carina, at least the apical part of petiole with a ventrolateral carina or flange; dorsolateral carina of first tergite represented by a blunt ridge that is incomplete just basad of the spiracle; median dorsal carinae of first tergite absent or represented by low blunt ridges on base of postpetiole; second tergite mat or polished, its punctures fine, usually weak, sparse or very sparse; tergite 7 without a median spot but often margined with yellow or white; ovipositor sheath about 0.52 as long as front wing; ovipositor moderately stout to very stout, somewhat compressed, its tip weakly sagittate or simply tapered.

Cryptanura is a predominantly Neoptropic genus. There are numerous species, many of them very similar in appearance and difficult to distinguish. Two species occur in eastern United

States (one of them reaching southern Canada) and a third has been collected near Brownsville, Texas.

Key to the Nearctic species of Cryptanura

1. Median basal part of second tergite black; whitish mark on metapleurum occupying only its dorsoposterior half; upper side of hind coxa of female without a black stripe . . . . **1. banchiformis** (Megerle)
   Median basal part of second tergite white or yellow; whitish mark on metapleurum covering most of its ventral as well as most of its dorsal part; upper side of hind coxa of female with a black stripe 2
2. Sublateral white stripe of propodeum strongly narrowed basad of the tooth (fig. 336,g); second tergite mostly mat, its punctures separated by about their diameter; frontal horns low, not on a common base.
   2. septentrionalis Cushman
   Sublateral white stripe of propodeum not narrowed basad of the tooth (fig. 337,a); second tergite completely polished, its punctures separated by about 2.5 times their diameter; frontal horns on a high common base.
   3. compacta (Cresson)

1. Cryptanura banchiformis (Megerle), new combination

FIGURE 336,f

Ichneumon Banchiformis Megerle, 1802, Appendix ad catalogum insectorum, quae mense novembris 1802 Vienne Austriae auctionis lege vendita fuere, p. 16. [♂]. Type: ♂, Georgia (lost).

Mesostenus spinarius Brullé, 1846, *In* Lepeletier: Histoire naturelle des insectes, hyménoptères, vol. 4, p. 227; ♀. Type: ♀, Carolina (Paris).

Mesostenus albopictus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 312; ♂. Name preoccupied by Smith, 1858. Type: ♂, Delaware (Philadelphia).

Mesostenus delawarensis Dalla Torre, 1901, Catalogus hymenopterorum, vol. 3, p. 540. New name for *M. albopictus.*

Front wing 9.5 to 11.5 mm. long; frontal horns small, separated at base; second tergite mat, less strongly mat in male, subpolished basally and apically, its punctures small, sharp, separated by about 2.5 their diameter in female, a little coarser and closer in male.

Male: Colored as in female except that scape sometimes has a small white mark in front, front and middle coxae and trochanters are entirely white, hind coxa blackish with a white stripe above, first hind trochanter fuscous with the apex fulvous, hind femur blackish with extreme base fulvous, apical 0.25 of hind tibia infuscate, front and middle tibiae and tarsi whitish except that fifth segments of the tarsi are brown, and hind tarsus white.

Female: Black. Head, thorax, hind coxa, and abdomen marked with white as in figure 336,f, the hind coxa mostly fulvous and basal two segments of abdomen with some fulvous tinges; flagellum with a broad white band; mesoscutum with a subcircular median white spot; mediobasal part of scutellum black; front and middle coxae light fulvous, infuscate at extreme base, whitish anterodorsally; legs beyond trochanters light fulvous, their tarsi pale fulvous with the last segment brown, the basal 0.3± of last segment of hind tarsus fulvous.

The type of the name *banchiformis* Megerle is lost. The original description is "ex Georg. Stat. Banch. Atr. flav. vari. ant. annul. Thor. 2 spinos." While brief and abbreviated, Megerle's description is of a species from Georgia, of the size and shape of *Banchus*, black with yellowish markings (including a white band on the flagellum), and the propodeum with evident teeth. This description fits the male of the present species perfectly, and while it could possibly have been based on some other species, it has seemed better to apply the name definitely, using the right of the first reviser, than to let it remain a *nomen dubium.*

Specimens (103♂, 67♀): From Alabama (Higgens Ferry in Chilton Co. and Pyriton); Arkansas (Camp Chaffee); District of Columbia (Washington); Florida (Gainesville, Orlando, Paradise Key, and Tarpon Springs); Georgia (Barnesville, Clayton at 2,000 ft., and Thomson's Mills); Kansas (Marion Co.); Maryland (Beltsville, Bowie, Chesapeake Beach, Cumberland, Solomons, Takoma Park, and Thomas Road near Cumberland); Massachusetts (Milton, Taunton, and Woods Hole); Michigan (Sawyer); Missouri (Creve Coeur Lake in St. Louis Co., Exeter, Kimmswick, and Ozark Mts. at Van Buren); New Jersey (Moorestown, Ocean Grove, Pemberton, Riverton, Vineland near Maurice River, and Wenonah); New York (Farmingdale and Maspeth); North Carolina (Cherokee at 2,000 ft., Kill Devil Hills in Dare Co., Long Beach, and Raleigh); Oklahoma (Hugo and Wyandotte); Ontario (Point Pelee); Pennsylvania (Heckton Mills, Lehigh Gap, and Pittsburgh); Rhode Island (Westerly); South Carolina (Greenville and McClellanville); Tennessee (Burrville, and Chilhowee Mts. in Sevier Co.); Texas (Barton Creek near Austin, Calvert, College Station, Plano, and San Antonio); Virginia (Arlington, Bellview to Difficult Run, Dayton, Falls Church, and Mount Vernon); and West Virginia (Bolivar and Cheat Mt. at 2,000 ft. in Randolph Co.).

Collection dates are rather evenly distributed from late spring to early fall. Unusually early and late dates of interest are: March 21 at Tarpon Springs, Fla.; March 26 at Gainesville, Fla.; April 11 at San Antonio, Tex.; May 18 at McClellanville, S.C.; May 20 at Solomons, Md.; May 27 on Thomas Road near Cumberland, Md.; September 24 at Westerly, R. I.; October 1 at Beltsville, Md.; October 23 at Arlington, Va.; and October 29 at Southern Pines, N.C.

This species flies about thickets, heavy undergrowth of rich deciduous woods, and overgrown edges of woods. Males have a fast dancing flight that is difficult to follow. The females are also fast but a little slower than the males. The sting of this species is moderately severe and of long duration. One sting received by the senior author was still painful on the night of the third day.

This species occurs in the Carolinian and Austroriparian faunas.

2. Cryptanura septentrionalis Cushman

Figure 336,g

Cryptanura septentrionalis Cushman, 1945, Proc. U.S. Nat. Mus., vol. 96, p. 156; ♀. Type: ♀, Cleveland, Ohio (Washington).

Front wing 7.4 to 10.5 mm. long; frontal horns very small, separated at base; second tergite mat, subpolished at base and apex, its punctures of moderate size, sharp, separated by about their diameter.

Male: Coloration similar to that of female.

Female: Black. Head, thorax, hind coxa and abdomen marked with white as in figure 336,g; scape white in front; flagellum with a broad white band; mesoscutum with a median, subcircular, white spot; front and middle coxae white, their bases and a small apical external spot fuscous; front and middle trochanters whitish, the first trochanters with a brownish stripe above; hind first trochanter fuscous, whitish apically; hind second trochanter mostly whitish; legs beyond trochanters fulvous, the last segment of tarsi brown.

Specimens: ♂, Washington, D.C., June 10, 1948, David Shappirio (Patuxent). ♀, Jennings, La., October–December 1906, A. A. Hammar (Ithaca). ♀, Atherton, Mo., June (Cambridge). ♀, St. Louis, Mo., June 29, 1938 (Washington). ♀, New York (New York). ♀, Rockaway Beach, Long Island, N.Y., J. Bequaert collection (Cambridge). ♀, Sea Cliff, Long Island, N.Y. (Ithaca). ♀, Wake Co., N.C., July 1, 1951, H. and M. Townes (Townes). ♀, Montgomery Co., Ohio, Aug. 4, 1943, F. D. De Gant (Columbus). ♀, Summit Co., Ohio, July 26, 1934, Louis J. Lipovsky (Lawrence). ♀, Allegheny Co., Pa. (Pittsburgh). ♀, Greenville, S.C., Sept. 3, 1955, L. and G. Townes (Townes). ♂, Cades Grove, Smoky Mts., Tenn., May 28, 1950, D. W. Pfitzer (Ottawa). ♀, Dayton, Va., Sept. 5, 1931 (Pittsburgh). ♀, no data (Washington).

This species occurs in the Carolinian and Austroriparian faunas.

3. Cryptanura compacta (Cresson)

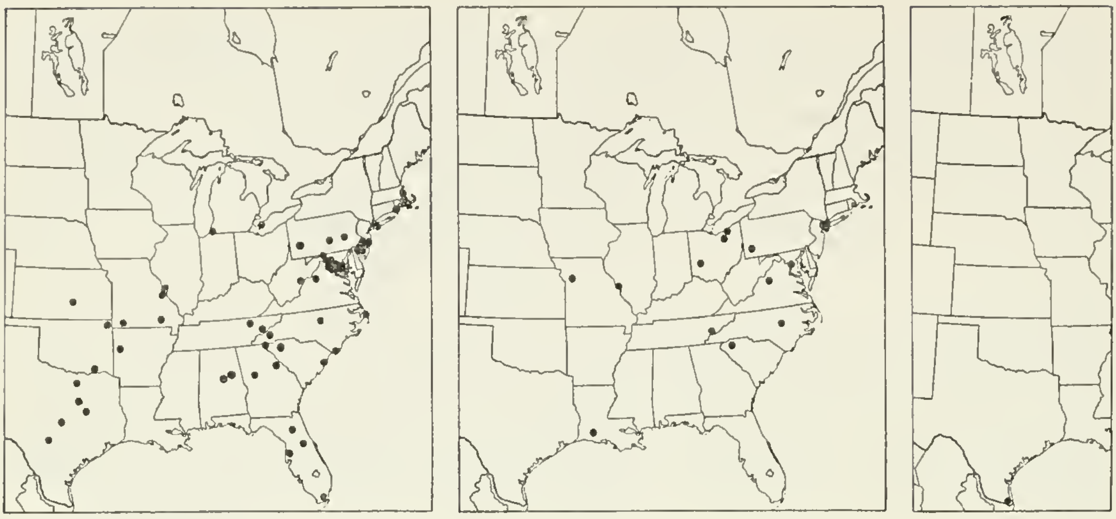
Figure 337,a

Mesostenus (*Mesostenus*) *compactus* Cresson, 1873, Proc. Acad. Nat. Sci. Philadelphia, vol. 1873, p. 153; ♀. Type: ♀, Orizaba, Mexico (Philadelphia).

Cryptanura planiscutellata Cushman, 1945, Proc. U.S. Nat. Mus., vol. 96, pp. 152, 175; ♀. Type: ♀, Puerto Castilla, Honduras (Washington).

Male: Unknown.

Female: Front wing 8 to 9 mm. long; frontal horns small, on summit



Figures 238–240.—Localities: 238 (left), *Cryptanura banchiformis;* 239 (center), *C. septentrionalis;* 240 (right), *C. compacta.*

of a high tubercle; second tergite completely polished, with irregular, rather weak punctures that are separated by about 2.5 their diameter.

Black. Head, thorax, hind coxa, and abdomen marked with yellowish white as in figure 337,a; flagellum with a broad white band; mesoscutum with a median subcircular, white spot; front and middle coxae whitish, blackish at base behind; front and middle trochanters whitish, the middle first trochanter black dorsally; hind first trochanter fuscous, apically whitish; hind second trochanter whitish, apically fuscous; front and middle legs beyond trochanters stramineous, their femora brown or black above and their tarsi brownish apically; hind femur stramineous, with a posterodorsal and posteroventral brown stripe, the upper and lower brown stripes joined on hind face of femur at base and apex; hind tibia and tarsus stramineous (apical two segments missing from hind tarsus of specimen at hand).

Specimen: ♀, Cameron Co., Tex., Aug. 3, 1928, R. H. Beamer (Lawrence).

This species ranges from southern Texas to Honduras.

26. Chamula, new genus

Figure 321,a

Front wing 7.8 to 9.5 mm. long; body rather slender; frons with a stout, median, conical horn; clypeus wide and short, strongly convex, its apex broadly truncate, without a median point, mesoscutum polished, strongly convex, its punctures coarse, strong, irregularly spaced, rather sparse to moderately dense; notaulus sharp and strong, reaching beyond center of mesoscutum; epomia strong; propodeum moderately long, its basal carina sharp and complete, its apical carina present only as a pair of sublateral crests; propodeal spiracle elliptic;

areolet very small, quadrangular, a little wider than high, a little higher at its apex than at its base, the second intercubitus weak; ramellus absent; nervulus basad of basal vein by about 0.3 its length; base of second discoidal cell broad; mediella weakly arched; nervellus broken near its hind end; axillus strong, rather close to anal margin; first abdominal segment rather stout, with a lateral subbasal tooth, its spiracle at its apical 0.40, its sternite ending opposite spiracle, the ventrolateral carina strong between its spiracle and apex, otherwise without distinct carinae; second tergite polished, its punctures fine, weak, separated by about the length of the hairs; tergite 7 without a median white spot but sometimes margined with yellowish white. The female is unknown.

Genotype: *Mesostenus reliquus* Cresson.

The generic name is from the Chamula Indians, a tribe in southern Mexico.

This genus contains the genotype from Louisiana and Mexico, and an undescribed species from Venezuela.

1. Chamula reliqua (Cresson), new combination

FIGURE 337,b

Mesostenus (*Polycyrtus*) *reliquus* Cresson, 1873, Proc. Acad. Nat. Sci. Philadelphia, vol. 25, p. 146; ♂. Type: ♂, Orizaba, Mexico (Philadelphia).

Male: Front wing 7.8 to 9.5 mm. long; punctures on mesoscutum coarse, irregularly distributed, their interspaces averaging about 1.0 their diameter, the punctures a little denser near edges of mesoscutum and along notauli.

Head, body, and hind coxa black and white as illustrated in figure 337,b; mouth parts white; antenna black, the flagellum with a broad, white, postmedian band; front and middle coxae white, with restricted brown markings; trochanters white, the front and middle first tro-

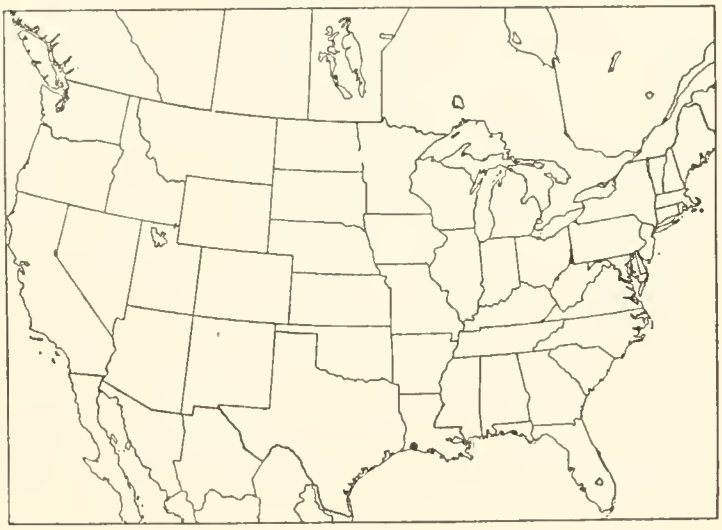


FIGURE 241.—Locality for *Chamula reliqua*.

chanters brown at base above; hind trochanters whitish, the basal 0.5± of the first hind trochanter dark brown; femora ivory, the front and middle femora pale to dark brown above and hind femur dark brown or black behind; tibiae and tarsi ivory, the fifth segment of front tarsus pale brown, fifth segment of middle tarsus medium brown, and apical half of fifth segment of hind tarsus brown; wings hyaline.

Female: Unknown.

Specimen: ♂, Cameron, La., June 20 to 30, 1905, James S. Hine (Townes).

27. Camera, new genus

Figure 321,b

Front wing 6.0 to 11.5 mm. long; body of moderate proportions; frons unarmed; mesoscutum moderately convex, polished or subpolished, its punctures medium sized, strong, usually dense; notaulus moderately sharp, reaching to or beyond center of mesoscutum; epomia moderately strong; propodeum strongly convex, its two transverse carinae simply arched or the apical one with its median portion displaced forward a little, the basal carina strong and complete, the apical carina strong, forming low sublateral crests, its median portion usually weaker and irregular or partly obsolete; propodeal spiracle elongate elliptic; areolet small or very small, subrectangular or subpentagonal, a little higher than wide, the second intercubitus moderately strong; ramellus absent; nervulus opposite basal vein to basad of it by about 0.3 the length of nervulus; base of second discoidal cell broad; mediella weakly arched, its median portion almost straight; nervellus broken somewhat below the middle; axillus moderately divergent from anal margin, rather long; first abdominal segment moderately short to moderately long, with a subbasal lateral tooth, its spiracle rather far behind its middle and postpetiole rather strongly expanded or swollen, with or without the ventrolateral and dorsolateral carinae, the median dorsal carinae absent; apex of first sternite between spiracle and apex of first tergite; second abdominal segment polished or subpolished, its punctures medium sized to fine, in either case closely spaced; tergite 7 without a median white spot; ovipositor sheath about 0.27 as long as front wing; ovipositor rather slender, compressed, its tip elongate sagittate, the point slender.

Genotype: *Mesostenus euryaspis* Cameron.

The generic name is from the Latin *camera* (an arch), referring to the strongly convex abdominal tergites.

There is only one Nearctic species, which ranges from Mexico into southern Texas. We have seen four additional species of the genus from southern Brazil, three of them undescribed and one named *Christolia thoracica* by Szépligeti in 1916.

Camera euryaspis (Cameron), new combination

Figure 337,c

Mesostenus euryaspis Cameron, 1885, Biologia Centrali-Americana, Insecta, Hymenoptera, vol. 1, p. 226; ♀. Type: ♀, Presidio, Mexico (London).

Front wing 6.0 to 7.0 mm. long; occipital carina running to lower condyle of mandible; venation as shown in figure 321,b; postpetiole not swollen; male postpetiole smooth, almost impunctate; basal half of female postpetiole (the black area) with coarse, strong, subconfluent punctures; apical half of female postpetiole (the white area) smooth and almost impunctate; second tergite subpolished, in male with small, weak punctures that are separated by about 1.3 their diameter, in female with moderate-sized strong punctures that are separated by about 0.3 their diameter; ovipositor about 4.7 as long from nodus to apex as it is deep at nodus.

Male: Head, thorax, and hind coxa marked with black and white as in female (fig. 337,c), except that face has a fuscous triangular area just above clypeus; palpi white; antenna black, the scape with a white mark in front and flagellum with a white band covering 2.5 segments; front and middle legs colored as in female except that tarsi are brown with the joints paler; hind trochanters fuscous, the first trochanter white below and apically above; hind femur fulvous, its apical 0.1 fuscous, the fuscous extending basad along dorsal edge; hind tibia fuscous, brownish medially below; hind tarsus white, the basal 0.33 of first segment and all of last segment, black; abdomen black, each tergite with a broad white apical band and first tergite with a lateral subbasal white stripe.

Female: Head, body, and hind coxa marked with black and white as in figure 337,c; palpi whitish; antenna black, the scape white below and flagellum with a white band that covers about 6 segments; front and middle coxae white, with an external apical fuscous spot; front

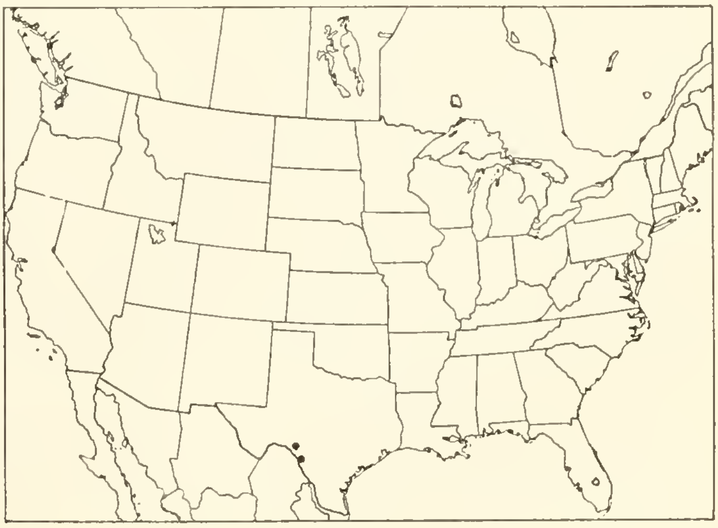


Figure 242.—Localities for *Camera euryaspis*.

and middle legs beyond trochanters fulvous, their first trochanters varied with whitish and fifth tarsal segments brown; hind first trochanter fulvous and white, infuscate basally; second hind trochanter, hind femur, and hind tibia, fulvous; first segment of hind tarsus and base of second segment fulvous brown; fifth segment of hind tarsus fulvous; remainder of hind tarsus white.

Specimens: ♀, Comstock, Tex., May 11, 1936, M. R. Chance (Townes). ♂, ♀, Del Rio, Tex., Apr. 26 and 27, 1959, J. F. McAlpine (Ottawa).

28. Genus Mesostenus

Figure 322,a

Mesostenus Gravenhorst, 1829, Ichneumonologia europaea, vol. 2, p. 750. Type: *Mesostenus transfuga* Gravenhorst; designated by Westwood, 1840.

Stenaraeus Thomson, 1896, Opuscula entomologica, fasc. 21, p. 2380. Type: *Mesostenus transfuga* Gravenhorst; designated by Viereck, 1914.

Umlima Cameron, 1902, Ann. Mag. Nat. Hist., ser. 7, vol. 9, p. 208. Type: *Umlima penetralis* Cameron; monobasic.

Derocentrus Cushman, 1919, Proc. Ent. Soc. Washington, vol. 21, p. 113. Type: (*Coleocentrus texanus* Ashmead) = *longicaudis* (Cresson); original designation.

Front wing 2.7 to 9.3 mm. long; body slender; frons unarmed but often with a median longitudinal carina that may be elevated as a crest; clypeus of medium size, short, strongly convex, its apical margin broadly truncate or weakly convex, without a median point; mesoscutum strongly convex, polished or subpolished, its punctures strong, rather close; notaulus sharp, extending beyond middle of mesoscutum; epomia moderately strong; propodeum in profile rather weakly convex, its basal carina complete, its apical carina complete or interrupted medially, forming weak, oblique, sublateral crests; propodeal spiracle long, elliptic; areolet very small, quadrangular, a little higher at apex than at base, about 1.6 as wide as high except in *M. eisenii*, in which it is approximately square; ramellus absent; nervulus basad of basal vein, usually by about 0.25 its length; base of second discoidal cell broad; mediella rather weakly arched; nervellus broken below the middle; axillus close to anal margin; first abdominal segment moderately long, rather slender, with a basal sublateral tooth, its spiracle near its apical 0.39, its ventrolateral carina usually distinct, its dorsolateral and median longitudinal carinae lacking; second tergite polished or subpolished, its punctures of moderate size, rather sharp, rather dense to quite sparse; tergite 7 without a white spot; ovipositor sheath 0.57 to 3.5 as long as front wing, usually about 0.73 as long; ovipositor moderately slender, somewhat compressed, its tip rather slender.

Mesostenus is a moderate-sized but widely distributed genus. It is divisible into several species groups, of which two occur in our fauna, as follows: 1. The Transfuga group is Holarctic in distribution, including in our fauna the species *albinotatus*, *liogaster*, *temporalis*, *melanurus*, *gracilis*, *clitellatus*, *sicarius*, and *thoracicus*. These have the clypeus rather narrow, second trochanter of hind leg short, and punctures on second tergite of female rather dense (except in *liogaster* and *temporalis*). 2. The Longicaudis group is mostly Mexican and Central American, with three species ranging northward into the United States. These are *eisenii*, *angustus*, and *longicaudis*. This group is characterized by the unusually wide clypeus, usually more or less elongate second trochanter of hind leg, and punctures on second tergite of female very sparse. It would be possible to recognize the group as a distinct genus (*Derocentrus*), but because of unresolved questions about the limits of various species groups of the tropics in both hemispheres, it is included in *Mesostenus*.

Previously the genus *Mesostenus* had very broad limits, containing nearly all the species of the tribe with the areolet small. About 60 years ago, Cameron started the trend of breaking "*Mesostenus*" into a large number of genera. Later, Cushman (1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 1) expressed the conviction that a small areolet is not a natural character in the tribe Mesostenini, and that even the grouping of genera on the size of the areolet resulted often in artificial assemblages. Subsequent work has fully confirmed this view.

The hosts of *Mesostenus* are the cocoons of various Lepidoptera, usually species with rather thin cocoons that are covered with frass, debris, or occurring in short tunnels. The parasite cocoon is spun within the host cocoon. It is thin, whitish or light brown, and somewhat translucent.

Keys to the Nearctic species of Mesostenus

MALES

(The male of *melanurus* is unknown.)

1. Hind coxa entirely black; segments 2–4 or 3–4 of hind tarsus entirely white (except sometimes in the European subspecies of *albinotatus*) 2
   Hind coxa fulvous or mostly fulvous, or rarely black, in which case segments 2–4 of hind tarsus are brown 4
2. Collar of pronotum white; prepectal carina distinct and strong up to subtegular ridge; temple moderately convex . . . . **3. temporalis,** new species
   Collar of pronotum black; prepectal carina obsolete dorsally, not distinct up to subtegular ridge; temple only weakly convex 3
3. Tergites 6 and 7 black . . . . **1. albinotatus** Gravenhorst
   Tergites 6 and 7 ferruginous . . . . **2. liogaster,** new species
4. Metapleurum and propodeum black marked with white; second hind trochanter 0.35 to 1.2 as long as first hind trochanter (second trochanter measured at its shortest place on upper edge, beginning at pointed apex of first trochanter;

first trochanter measured at its longest place on upper edge). 5

Metapleurum and propodeum largely or entirely fulvous, or if black then not marked with white; second hind trochanter 0.12 to 0.3 as long as first hind trochanter 6

5. Second hind trochanter about 0.5 as long as first hind trochanter; hind basitarsus white with its basal 0.3 ± fuscous . . . . . . **10. angustus** Townes

Second hind trochanter about 1.2 as long as first hind trochanter; hind basitarsus entirely brown . . . . **11. longicaudis** Cresson

6. Areolet about 1.0 as wide as high; mesopleurum mostly black or fuscous with a broad, oblique yellow stripe (fig. 337,d); clypeus broad, its apical margin almost straight . . . . **9. eisenii** Ashmead

Areolet about 1.3 to 2.0 as wide as high; mesopleurum entirely fulvous to entirely black, without an oblique yellow stripe; clypeus only moderately wide, its apical margin arcuate 7

7. Apical 0.3 or less of hind basitarsus white, the rest fuscous, usually the entire basitarsus fuscous; flagellum usually entirely black, sometimes with a short white median stripe above 8

Apical 0.5 to 0.8 of hind basitarsus white, the rest fuscous; flagellum nearly always with a median white dorsal stripe or a pale band 9

8. Upper end of prepectal carina sharp to about upper 0.4 of hind margin of pronotum, not ending in a white callus but sometimes surrounded by whitish; postscutellum black, or rarely white . . . . . . **5. gracilis** Cresson

Upper end of prepectal carina sharp to about lower 0.3 of hind margin of pronotum, ending at or becoming obsolescent in a white elliptic callus; postscutellum white . . . . **7. sicarius,** new species

9. Postscutellum black; propodeum largely or entirely black basad of its basal carina . . . . **6. clitellatus,** new species

Postscutellum white; propodeum usually mostly or entirely fulvous basad of its basal carina, but sometimes entirely black . . . . **8. thoracicus** Cresson

FEMALES

1. Ovipositor sheath about 3.2 as long as front wing; head and thorax entirely fulvous; second hind trochanter about 1.2 as long as first hind trochanter (both trochanters measured along dorsal edge, where second trochanter is shortest and first trochanter longest) . . . . . . **11. longicaudis** Cresson

Ovipositor sheath about 0.55 to 0.93 as long as front wing; head and thorax (at least the pronotum) partly or entirely black; second hind trochanter about 0.1 to 0.5 as long as first hind trochanter 2

2. Hind coxa entirely black; propodeum and metapleurum entirely black . 3

Hind coxa entirely or largely fulvous; propodeum and metapleurum entirely fulvous or partly black, or black and white, or rarely entirely black . 6

3. Ovipositor about 3.6 as long from nodus to apex as it is deep at nodus; prepectal carina distinct and sharp up to subtegular ridge; temple moderately convex; second tergite mat, with small punctures that are separated by about 5.0 their diameter . . . . **3. temporalis,** new species

Ovipositor about 5.5 to 6.5 as long from nodus to apex as it is deep at nodus; prepectal carina obsolescent dorsally, not distinct to the subtegular ridge. 4

4. Punctures on second tergite moderately small, separated by about 1.5 their diameter . . . . **1. albinotatus** Gravenhorst

Punctures on second tergite very small, separated by about 4 or 5 times their diameter. 5

5. Temple weakly convex; ovipositor sheath about 0.93 as long as front wing; abdomen entirely ferruginous, except for base of its first segment. **2. liogaster,** new species
   Temple strongly convex; ovipositor sheath about 0.57 as long as front wing; abdomen black apically . . . . **4. melanurus** Cushman
6. Propodeum and metapleurum black, with large white marks; punctures on second tergite separated by about 6 times their diameter. **10. angustus** Townes
   Propodeum and metapleurum entirely fulvous or fulvous and black, or rarely entirely black 7
7. Apical carina of propodeum complete, not interrupted medially; punctures on second tergite separated by about 5.0 their diameter; areolet about 1.0 as wide as high . . . . **9. eisenii** Ashmead
   Apical carina of propodeum interrupted medially; punctures on second tergite separated by about 0.75 to 1.5 their diameter; areolet about 1.3 to 2.0 as wide as high. 8
8. Upper end of prepectal carina sharp to about lower 0.3 of hind margin of pronotum, where it ends or is obsolescent in an elliptic white callus; ovipositor about 11.5 as long from nodus to apex as it is deep at nodus; postscutellum white . . . . **7. sicarius,** new species
   Upper end of prepectal carina sharp to about upper 0.4 of hind margin of pronotum, there being no white area or callus at its upper end; ovipositor about 4.5 to 7.0 as long from nodus to apex as it is deep at nodus . . 9
9. Ovipositor about 4.5 as long from nodus to apex as it is deep at nodus; postscutellum white; thorax unusually stout; apical carina of propodeum forming strong, moderately oblique sublateral crests . . **8. thoracicus** Cresson
   Ovipositor about 6.3 or 7.0 as long from nodus to apex as it is deep at nodus; postscutellum black, or rarely white; thorax of normal slenderness for the genus; apical carina of propodeum forming very weak, strongly oblique sublateral crests 10
10. Ovipositor about 7.0 as long from nodus to apex as it is deep at nodus; propodeum basad of its basal carina usually fulvous or mostly so; front wing 3.6 to 6.7 mm. long; frons with a weak median carina. **5. gracilis** Cresson
   Ovipositor about 6.3 as long from nodus to apex as it is deep at nodus; propodeum basad of its basal carina largely black; front wing 5.0 to 8.5 mm. long; frons with a median compressed ridge. . **6. clitellatus,** new species

1. Mesostenus albinotatus Gravenhorst

Front wing 2.7 to 6.8 mm. long; clypeus small, strongly convex, its apical margin strongly arcuate; temple weakly convex; prepectal carina ending just above middle of hind margin of pronotum, sometimes traceable more dorsad to the subtegular ridge but usually not; punctures on mesopleurum of moderate size, strong, most of those above the middle separated by about 0.7 their diameter, those near and just below the middle very crowded and usually obscured or obliterated by rugulosity; apical carina of propodeum usually sharp throughout, weaker medially and laterally and sometimes obsolete medially, the median portion projected forward as a broad U or V which is usually round-bottomed in male and square-bottomed in female; areolet about 1.6 as wide as high; second tergite of female mat, with rather small punctures that are separated by about 1.5 their diameter; ovipositor sheath about 0.73 as long as front wing; ovipositor about 6.1 as long from nodus to apex as it is deep at nodus.

Male: Black. Anterior orbit (widened below), clypeus, and often a broad median pair of stripes on face and clypeus, white, these white areas often enlarged and fused; mandible white; segments 2–5 of maxillary palpus white or the second and fifth segments more or less brownish; labial palpus brown; all of tegula, or part, or a basal spot on tegula, white; nearly always a short stripe at upper end of epomia, often carinae at base of scutellum, often the subtegular ridge, front of front coxa, usually apical part of front of middle coxa, and under side of front and middle first trochanters, white; front and middle trochanters dark brown except where white; front and middle femora and tibiae fulvous; front and middle tarsi pale fulvous, their fifth segments blackish brown; hind femur ferruginous, in the subspecies *albinotatus* more or less infuscate basally, in both subspecies the apex a little infuscate; hind tibia blackish, stained with ferruginous basally; hind tarsus black, the apical part of its first segment sometimes, segment 2 usually, and segments 3–4 nearly always white (segments 3–4 reported as sometimes black in the subspecies *albinotatus*, white in all of our specimens of *promptus*); wings subhyaline or faintly infuscate; abdomen ferruginous, black beyond the third, fourth, or fifth segment.

Female: Black. Frontal and facial orbits usually with a narrow white mark; labial palpus and basal one and a half segments of maxillary palpus dark brown, the rest of maxillary palpus light brown; flagellum with a median dorsal white stripe that covers 3 or 4 segments; subtegular ridge and small mark at upper end of epomia sometimes white; tegula dark brown, with a whitish spot anteriorly; front and middle femora and tibiae ferruginous, the tibiae often dusky above; hind femur ferruginous, its apex a little infuscate, in the subspecies *albinotatus* more or less infuscate basally; hind tibia dark brown or black; tarsi light brown to dark brown, paler at the joints and segments 2–4 of hind tarsus paler than segments 1 and 5 of hind tarsus; wings subhyaline to weakly infuscate; abdomen ferruginous, usually infuscate apically.

There is a European and an American subspecies as keyed and described below:

1. Tergite 4 black; hind femur ferruginous, often fuscous basally, its apex weakly infuscate; white markings on head, thorax, and trochanters of male averaging less extensive; range: Europe . . . **1a. albinotatus albinotatus** Gravenhorst

Tergite 4 ferruginous; hind femur ferruginous, not infuscate basally, its apex weakly infuscate; white markings on head, thorax, and trochanters of male averaging more extensive; range: North America.
1b. albinotatus promptus Cresson

1a. Mesostenus albinotatus albinotatus Gravenhorst

Mesostenus albinotatus Gravenhorst, 1829, Ichneumonologia europeae, vol. 2, p. 756; ♂, ♀. Types: ♂, ♀, Sickershausen, Volhynia, Vienna, and Hanover, all in Europe (?Wroclaw).

This is the European subspecies, distinguished from the American subspecies as noted in the key. All tergites beyond the third are black, in both sexes.

Specimens: 3♂, 8♀, from Germany.

1b. Mesostenus albinotatus promptus Cresson, new status

Mesostenus promptus Cresson, 1878, Canadian Ent., vol. 10, p. 209; ♂. Lectotype: ♂, Canada (Philadelphia).

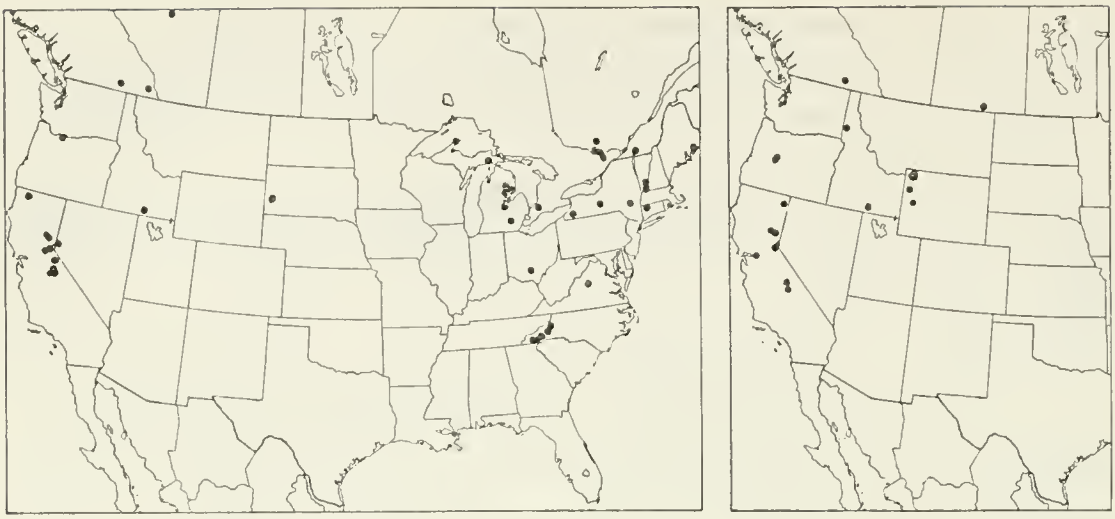
Mesostenus americanus Cresson, 1878, Canadian Ent., vol. 10, p. 209: ♀. Lectotype: ♀, Virginia (Philadelphia).

Exetastes brevipennis Provancher, 1883, Petite faune entomologique du Canada . . . hyménoptères, p. 386; ♂, ♀. Lectotype (hereby designated): ♂, Quebec (Quebec).

This is the American subspecies, distinguished as noted in the key. In the male, tergites 6–8 are black (but the base of tergite 6 sometimes partly ferruginous), and usually tergite 5 is partly or entirely black. In the female, tergites 6–8 vary from entirely black to mostly ferruginous, but always tergite 8 and a dorsal area on tergite 7 are infuscate. Tergite 5 is often fuscous apically.

Specimens (46♂, 36♀): From Alberta (Edmonton); British Columbia (Lizard Creek near Fernie and Robson); California (Camino, Crane Flat in Yosemite National Park, Devils Basin at 8,200 ft. in El Dorado Co., Gazelle, Giant Forest in Tulare Co., Gold Lake in Sierra Co., Quincy, near Sonora Pass at 8,000 and 8,500 ft., and Tuolumne Meadows in Yosemite National Park); Colorado; Connecticut (Colebrook); Idaho (Basin in Cassia Co.); Maine (Machias); Michigan (Ann Arbor, Arenac Co., Gladwin Co., Gratiot Co., Keweenaw Co., Midland Co., Naubinway, and Ogemaw Co.); Nevada (Washoe Lake near Carson City); New Brunswick (Waweig); New York (Bemus Point, Greene Co., and Ludlowville); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Craggy Gardens in Buncombe Co. at 5,300 ft., Highlands, Mount Pisgah at 4,800 to 5,300 ft., and Wayah Bald in Macon Co. at 5,400 ft.); Ohio (Ross Co.); Ontario (Bells Corners and Strathroy); Oregon (Hood River); Quebec (Aylmer, Gracefield, Granby, and Wakefield); South Dakota (12 miles southwest of Rapid City); Vermont (Laurel Lake near Jacksonville and Woodstock); and Virginia (Skyline Drive).

Collection dates are from early to late summer, most of them in the middle part of summer. The earliest and latest records are: May 21 in Midland Co., Mich.; June 3 at Granby, Que.; June 7 in Mackinac



FIGURES 243, 244.—Localities: 243 (left), *Mesostenus albinotatus promptus;* 244 (right), *M. liogaster.*

Co., Mich.; September 11 at Gazelle, Calif.; September 14 in Gratiot Co., Mich.; and September 18 at Bells Corners, Ont.

Our collections have been from places where there are weeds, grass, and scattered trees or bushes.

This subspecies is transcontinental, mostly in the Transition zone.

2. Mesostenus liogaster, new species

Front wing 6.2 to 8.0 mm. long. Structurally similar to *M. albinotatus* except as follows: Body sculpture a little smoother and with punctures a little coarser; punctures just below middle of mesopleurum crowded and irregular in shape but never completely obliterated by rugulosity; second tergite of female subpolished or weakly mat, with very small punctures that are separated by about 5.0 their diameter; ovipositor sheath about 0.93 as long as front wing.

Male: Colored like the male of *M. albinotatus* except as follows: White on frontal orbit averaging a little narrower; clypeus entirely white, white with more or less of the median part black, or entirely black; face without median white marks; second segment of labial palpus mostly white; pronotum entirely black; hind femur varying from entirely black to ferruginous with its apex infuscate; wings faintly infuscate; and abdomen ferruginous except that genitalia are fuscous and tergite 8 more or less infuscate.

Female: Black. Palpi fuscous, the last three segments of maxillary palpus usually paler; flagellum with an obscure whitish dorsal stripe on one to three of its median segments; wings weakly to strongly infuscate; front and middle femora brown or blackish, more or less ferruginous in front, especially apically; front and middle tibiae fulvo-ferruginous in front, the rest dark brown; front and middle tarsi dark brown, paler at the joints; hind femur black or ferruginous; hind tibia black; hind tarsus fuscous, its third through fourth segments brown; abdomen ferruginous, the first segment infuscate basally.

Type: ♀, Jackson, Wyo., W. B. Sheppard (Washington, USNM 63826). This specimen has the hind femur black.

Paratypes (9♂, 15♀): From British Columbia (Robson); California (Brentwood, Davis Creek in Modoc Co., Devils Basin at 8,200 ft. in El Dorado Co., Gold Lake in Sierra Co., Lone Pine, Owens Lake in Inyo Co., and 4 miles west of Quincy); Idaho (Moscow and Oakley at 4,542 ft.); Northwest Territories (Fort Norman on McKenzie River); Oregon (Bend and Elk Lake in Deschutes National Forest at 4,600 ft.); Saskatchewan (Pickthall); Wyoming (22 miles north of Daniel, Jackson, Madison River in Yellowstone National Park, Mount Washburn in Yellowstone National Park, and Riverside in Yellowstone National Park); and Mexico (15 km. east of Sombrerete in Zacatecas).

Collection dates are from mid-spring to mid-fall, the earliest and latest dates being: May 15 at Robson, B.C.; May 28 at Brentwood, Calif.; June 2 at Owens Lake, Inyo Co., Calif.; September 19 four miles west of Quincy, Calif.; and October 22 at Robson, B.C.

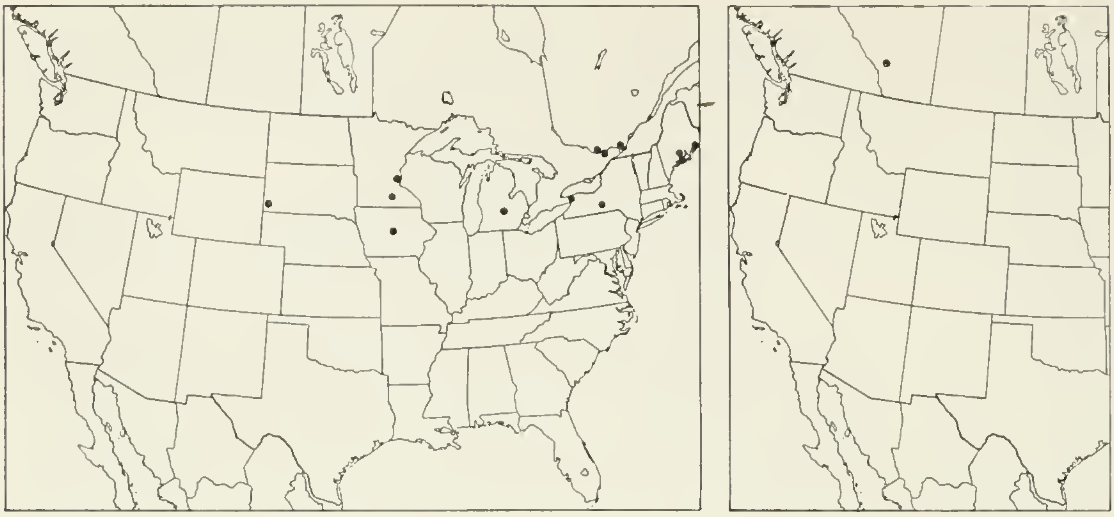
This species ranges from southern Saskatchewan and British Columbia to central California.

3. Mesostenus temporalis, new species

?*Mesostenus tarsatus* Provancher, 1875, Naturaliste Canadien, vol. 7, pp. 265, 267; ♂. Name preoccupied by Cresson, 1865. Types: 2♂, Quebec (lost).

Front wing 6.5 to 7.5 mm. long; clypeus small, strongly convex, its apical margin rather strongly arcuate; temple moderately convex; prepectal carina strong and sharp dorsad to subtegular ridge; punctures on mesopleurum moderately coarse, strong, separated by about 0.6 their diameter except that at middle of mesopleurum they are crowded; apical carina of propodeum moderately strong, a little weaker laterally, usually very narrowly interrupted medially in male, usually rather broadly interrupted medially in female; areolet about 1.4 as wide as high; second tergite of female mat, with very small punctures that are separated by about 5.0 their diameter; ovipositor sheath about 0.73 as long as front wing; ovipositor tip about 3.6 as long from nodus to apex as it is deep at nodus.

Male: Black. Frontal orbit, face except median part, clypeus, palpi except their first segments, collar, more or less of upper margin of pronotum, tegula, subtegular ridge, ridge at base of scutellum, scutellum except for a median black strip, and much or most of front and middle coxae, white; front and middle trochanters white, brown above; front and middle femora, tibiae, and tarsi fulvous, the fifth tarsal segments brown; hind femur varying from fulvoferruginous with its



FIGURES 245, 246.—Localities: 245 (left), *Mesostenus temporalis;* 246 (right), *M. melanurus.*

apex infuscate to entirely fuscous; hind tibia blackish, usually brownish subbasally; first and last segments of hind tarsus fuscous, the rest white; wings subhyaline; abdomen fulvoferruginous, the clasper fuscous.

Female: Black. Palpi dark brown, the apical segments of maxillary palpus paler; flagellum with a median incomplete white band that covers about 4 segments; tegula dark brown, sometimes whitish basally; pronotum sometimes with a small white spot at upper end of epomia; subtegular ridge sometimes white; front and middle femora dark brown, light brown in front, especially apically; front and middle tibiae light brown, darker above; front and middle tarsi brown; hind femur black or blackish brown; hind tibia black; hind tarsus dark brown, its second through fourth segments sometimes paler; wings subhyaline; abdomen fulvoferruginous, its first segment sometimes fuscous basally.

The original description of *Mesostenus tarsatus* Provancher agrees with the male of this species very well, except that the face is described as entirely white. In the males at hand the median part of the face is black. Provancher synonymized his *M. tarsatus* with *Trachysphyrus albitarsis albitarsis*, but this cannot be correct if the areolet was "très petite, carée," as he described it.

Type: ♀, La Trappe, Que., Aug. 27, 1946, J. Ouellet (Washington, USNM 63827).

Paratypes (6♂, 12♀): From Iowa (Ames); Maine (Lincoln Co., Machias, and Winslow); Michigan (East Lansing); Minnesota (Owatonna and Ramsey Co.); New York (Ithaca and Niagara Falls); Ontario (Ottawa); Quebec (La Trappe and Norway Bay); and South Dakota (Pringle).

Dates of collection are from early to late summer, the earliest and latest records being: May 29 at East Lansing, Mich.; June 13 at

Niagara Falls, N.Y.; August 18 at Winslow, Maine; and August 27 at La Trappe, Que.

This species occurs in the Alleghanian fauna.

4. Mesostenus melanurus Cushman

Mesostenus melanurus Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 47; ♀. Type: ♀, Calgary, Alta. (Washington).

Male: Unknown.

Female: Front wing 5.5 mm. long; body build exceptionally stout; clypeus very convex, in profile forming a low, rounded pyramid; apical edge of clypeus strongly arcuate; thorax very short and stout; temple strongly convex, the head 0.90 as wide across midlength of temple as across widest point of eyes; prepectal carina ending dorsad at middle of hind edge of pronotum; punctures on mesopleurum rather coarse, near center of mesopleurum obscured by fine rugulosity; apical carina of propodeum very strong, extending forward to near basal carina, not produced sublaterally as a crest, its median 0.2 weak; areolet 1.65 as wide as high; second tergite subpolished, with fine, weak punctures that are separated by about 4 times their diameter; ovipositor sheath 0.57 as long as front wing; ovipositor 5.5 as long from nodus to apex as it is deep at nodus.

Black. Knees brown; tibiae and tarsi brown, the hind ones fuscous brown; wings hyaline; apical 0.4 of first abdominal segment and all of second and third segments dark ferruginous.

Redescribed from the type, a female labeled: Calgary, Alberta, May 12, 1923, G. Salt (Washington).

5. Mesostenus gracilis Cresson

Mesostenus gracilis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 315; ♂. Type: ♂, Virginia (Philadelphia).

Nematopodius orbitalis Ashmead, 1890, Bull. Colorado Biol. Assoc., vol. 1, p. 21; ♀. Type: ♀, Westcliffe, Colo. (Washington).

Front wing 3.6 to 6.7 mm. long; clypeus small, strongly convex, its apical margin weakly arcuate; temple short, moderately convex; prepectal carina sharp dorsad to about upper 0.4 of hind margin of pronotum; punctures on mesopleurum moderately coarse, strong, separated by about 0.3 their diameter in male, a little closer in female; apical propodeal carina of male complete or with a narrow median interruption; apical propodeal carina of female broadly interrupted medially, its lateral section strongly oblique, sublaterally weakly elevated to form a weak crest; areolet about 1.6 as wide as high; second tergite of female moderately mat to subpolished, its punctures rather small and weak, separated by about 1.5 their diameter; ovipositor sheath about 0.7 as long as front wing; ovipositor tip about 7.0 as long from nodus to apex as it is deep at nodus.

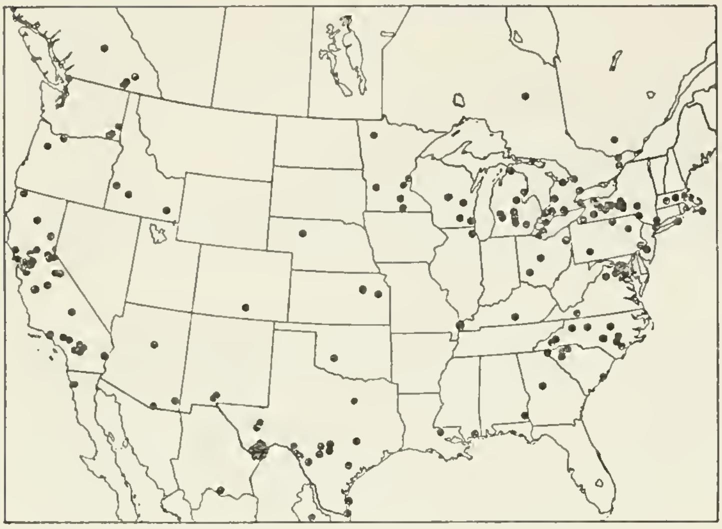


FIGURE 247.—Localities for *Mesostenus gracilis.*

Male: Head black, the orbits except for an interruption on upper part of temple, clypeus, and center of face, white, the white facial orbit and central white spot on face often enlarged and fused, the entire face thus sometimes white; mouth parts white; antenna black, the scape often white in front and rarely the flagellum with a median white stripe above that covers 2–4 segments; thorax mostly black anteriorly, mostly fulvous posteriorly, usually the pronotum, mesonotum, and metanotum black marked with white and the rest of thorax mostly fulvous. Sometimes the thorax is almost entirely black and rarely it is all black except for restricted white markings. Sometimes the mesoscutum is fulvous with the margins and notauli fuscous. White thoracic markings include the upper and lower margins of pronotum, tegula, subtegular ridge, basal carinae of scutellum, sides and apex of scutellum, often more or less of mesosternum, usually a median spot on mesoscutum, lower part of mesopleurum, dorsal part of prepectus, and rarely the postscutellum. Coxae and trochanters fulvous, the front and middle trochanters usually marked with white and all coxae and trochanters often with fuscous areas of varying size; front and middle legs beyond trochanters fulvous, their tarsi brown apically; hind femur fulvous; hind tibia fulvous, its base and its dorsal half more or less infuscate; hind tarsus fuscous, paler at the joints, sometimes its median segments and as much as the apical 0.2 of its first segments partly or entirely white; wings hyaline or subhyaline. Abdomen fulvous.

Female: Colored about like the female of *M. thoracicus* except that the scutellum is usually black rather than white. Very often the face is black with the orbits and a large median quadrate spot white. Often these white areas are more or less enlarged and fused, the face being sometimes entirely white. The ground color of the mesonotum is sometimes fulvous with infuscate margins and sutures rather than entirely black. Often the fulvous areas on the thorax, especially the anterior ones, are more or less replaced by black and rarely the thorax is entirely black except for restricted white markings. In unusually dark colored specimens the coxae and trochanters may be more or less fuscous but always the hind coxa is at least partly fulvous.

Specimens from the Rocky Mountains and the Sierra Nevada tend to have the dark markings more extensive, general build stouter, and body sculpture smoother and with slightly sparser punctation.

Specimens (169♂, 280♀): From Alabama (Headland); Arizona (Nogales, Oak Creek Canyon, and Rustlers Park in Chiricahua Mts. at 8,400 ft.); British Columbia (Kaslo, Robson, Salmon Arm, and Warfield); California (Antioch, Berkeley, Blythe, Camino, Concord, Crane Flat in Yosemite National Park, Davis, Farmersville, "Fish Canyon," Graeagle, Halemeiers near Locans, Herkey Creek in San Jacinto Mts., Indio, Laguna Mt. [in San Benito Co.] at 6,000 ft., Leevining, Marion Mt. Camp in San Jacinto Mts., Mesa Grande in Sonoma Co., Mill Creek Canyon in San Bernardino Co., Mill Valley, Pasadena Quadrangle in Santa Anita Canyon at 2,000 ft., Patrick's Creek, Pomona, Round Mountain, Sacramento, San Antonio Ranger Station in Santa Clara Co., Saticoy, near Sonora Pass at 8,500 ft., Volcano, and Walker Pass in Kern Co.); Connecticut; District of Columbia (Washington); Georgia (Fort Valley and Pine Mt. in Rabun Co. at 1,400 ft.); Idaho (Hartley Canyon summit in Power Co., 2 miles north of Melba, and 9 miles north of Mountain Home near Hot Spring); Illinois (Algonquin); Kansas (Lawrence and Manhattan); Kentucky (Crailhope); Louisiana (Baton Rouge); Maryland (Beltsville, "Fredericksburg," Plummers Island, Sandy Spring, and Takoma Park); Massachusetts (Amherst, Brookline, Cohasset, Milton, Nantucket, and New Braintree); Michigan (Alto, Ann Arbor, Arenac Co., Aurelius, Douglas Lake, East Lansing, Grand Rapids, Ithaca, and Midland Co.); Minnesota (Freeborn Co., Lake Minnetonka, Plummer, St. Peter Fish Hatchery, Washington Co., and Yellow Medicine Co.); Mississippi (Biloxi); Missouri (Sikeston); Nebraska (Hooker Co.); New Jersey (Moorestown); New Mexico (Las Cruces and Mesilla); New York (Alabama, Bemus Point, Bethany, Cuba, Frontenac Point on Cayuga Lake, Garrattsville, Geneseo, Geneva, Hancock, Ithaca, McLean, Mecklenberg Road 5 miles west of Ithaca, Montauk, New Hope, Nyack, Waterville, and West Farms in New York City); North Carolina (summit of Black Mts., Clinton, Faison, Mills River, North Wilkesboro, Raleigh, Southern Pines, Wallace, and Winston-Salem); Nova Scotia (Baddeck); Ohio (Canfield, Delaware Co., Put-in-Bay on South Bass Island, and Spring Valley); Oklahoma (Lawton); Ontario (Chatham, Goderich, Markham, Norfolk [County], Orillia, Ottawa, Pelee Island, Sarnia, Smoky Falls on Mattagami River, Spencerville, Strathroy, Thornbury, and Vineland Station); Oregon (Parkdale and Willamette Valley); Pennsylvania (Midvale [Plains], Roxborough, Westmoreland Co., and Wilawana); Quebec (Maniwaki); South Carolina (Clemson College, Gaffney, Greenville, and McClellanville); Texas (The Basin in Big Bend National Park at 5,000 to 6,000 ft., Blanco Co., Boot Spring in Chisos Mts. in Big Bend National Park at 6,000 to 7,000 ft., Brownsville, Castolon in Big Bend National Park at 2,000 ft., College Station, Comstock, Dallas, Devil's River, Dimmit Co., Dogger Flats in Big Bend National Park at 3,000 ft., Grapevine Springs in Big Bend National Park at 3,000 ft., Green Gulch in Big Bend National Park at 5,000 ft., Headquarters of Big Bend National Park, Kerrville, Limpia Canyon near Fort Davis, Nine Point Draw in Big Bend National Park at 2,500 ft., Oak Spring in Big Bend National Park at 4,000 ft., Padre Island, Point of Rocks near Fort Davis, Quemado, Salado Creek in Bexar Co., Station Elena in Big Bend National Park at 2,100 ft., Tornillo Flats in Big Bend National Park at 2,500 ft., Uvalde, and Victoria); Virginia (Arlington, Falls Church, Galax, Vienna, and Winchester); Washington (Birch Bay in Whatcom Co., "Gulf Road" in Whatcom Co., Mill Creek near Walla Walla, Pullman, and Walla Walla); West Virginia (Bolivar); Wisconsin (Cranmoor, Madison, Muskego, and Oshkosh); Baja California (Ensenada); Mexico (16 miles south of Hidalgo del Parral in Chihuahua at 6,250 ft., Monterrey in Nuevo Leon, and above Tepic); and Bermuda.

Dates of collection outdoors are distributed from mid-spring to mid-fall. The species often breeds in buildings and is collected on windows. The relatively large proportion of these kinds of collections (sometimes without notation that they are from indoors) makes detailed collection dates of relatively little value. In general, outdoor specimens occur near the southern border of the United States from March to November. In northern United States and southern Canada they are to be found from late May to mid-October.

Rearing records are as follows: 2 reared lots from *Laetilia coccidivora*, 1 from *L. coccidivora?*, 1 from *Laetilia* sp., 2 from *Anagasta kühniella*, 2 from *Ozamia clarefacta*, 3 from *Ozamia* sp., 1 from *Melissopus*, 2 from *Euzophera semifuneralis*, 1 from *E. semifuneralis?*, and 1 from "grain moth." Other notes on pin labels, some of which suggest hosts, are: "in tobacco warehouse," "reared from under bark of grape vine," "reared from acorn," "from grain elevator infested with *Plodia interpunctella*," "in stored wheat," "on barn windows," and "in stored peanuts" (three lots). We have taken the species both in the wild, far from habitations, and several times on the windows of buildings containing stored grain or grain products. Usually, it occurs in open, dry, semidesert, or desert habitats.

This species occurs throughout the United States and adjacent parts of Canada and Mexico.

6. Mesostenus clitellatus, new species

Front wing 5.0 to 8.5 mm. long; clypeus small, strongly convex, its apical margin straight; temple moderately convex; prepectal carina ending dorsally near upper 0.4 of hind margin of pronotum, its upper part not so sharp as the rest and forming the hind margin of a white spot; punctures on mesopleurum moderately coarse and strong, those near middle of mesopleurum crowded and irregular, their margins tending into longitudinal wrinkling; apical propodeal carina of male sharp, complete or sometimes with a narrow median interruption, sublaterally elevated as a weak crest; apical propodeal carina of female rather broadly interrupted medially, its lateral section rather strongly oblique, sublaterally weakly elevated to form a weak crest; areolet about 1.6 as wide as high; second tergite of female weakly mat, its punctures of moderate size, separated by about 0.8 their diameter; ovipositor sheath about 0.73 as long as front wing; ovipositor tip about 6.3 as long from nodus to apex as it is deep at nodus.

Coloration of both sexes similar to that of corresponding sex of *M. thoracicus* except that postscutellum and apex of scutellum are always black, and that propodeum basad of its basal carina averages more extensively black. Usually the basal area of the propodeum has a broad transverse black mark which is a little constricted on the midline, so that it has some resemblance to a pair of pack saddles. This is the origin of the specific epithet "*clitellatus*."

Type: ♀, Moorestown, N.J., July 20, 1939, H. and M. Townes (Washington, USNM 63828).

Paratypes (54♂, 58♀): From Arkansas (Bentonville); British Columbia (Robson); Connecticut (South Meriden); Illinois (Florence); Iowa (Ankeny and Jefferson Co.); Kansas (Baldwin, Johnson Co.,

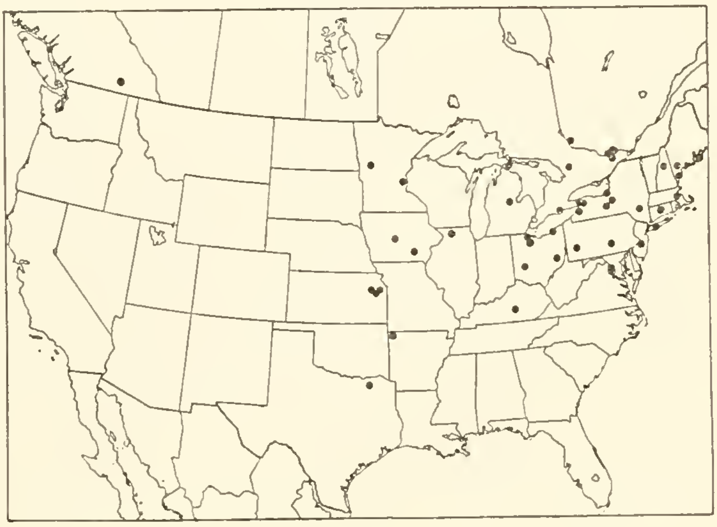


Figure 248.—Localities for *Mesostenus clitellatus*.

and Lawrence); Kentucky (Crailhope); Maine (Bridgton, Bubble Pond outlet on Mount Desert Island, and Kennebunkport); Massachusetts (Holliston); Michigan (Mackinac Island and Midland); Minnesota (Anoka Co. and Camp Carlos near Alexandria); New Hampshire (Franconia); New Jersey (Moorestown); New York (Babylon, Derby, Greene Co., Ithaca, Lancaster, New Hope, Niagara Falls, and Oswego); Nova Scotia (Aldershot); Ohio (Bono, Cleveland, Jerusalem, Montgomery Co., and Perkins); Ontario (Gravenhurst in Muskoka District, Normandale, and Ottawa); Pennsylvania (Allegheny Co. and West Fairview); Quebec (Aylmer, Kingsmere, and Laniel); Texas (Paris); Utah ("Rainbow Lodge"); and Virginia (Difficult Run and Vienna).

Dates of collection are from late spring to late summer. The earliest and latest dates are: April 3 at Paris, Tex.; May 18 in Jefferson Co., Iowa.; May 19 in Anoka Co., Minn.; September 14 at Difficult Run, Va.; and September 19 in Montgomery Co., Ohio and at Robson, B.C.

Reared specimens are as follows: ♂, 3♀, from *Pyrausta futilalis*, Jerusalem, Ohio, Aug. 1 and 10, 1932, L. G. Jones. ♂, from *Pyrausta futilalis*, Bono, Ohio, Feb. 20, 1924, C. R. Neiswander. ♂, from *Pyrausta futilalis*, Perkins, Ohio, June 13, 1931, L. G. Jones. 2♂, 1♀, from *Pyrausta futilalis*, Vienna, Va., May 2 and 4, 1912, R. A. Cushman.

This species occurs mostly in the Alleghanian and Carolinian faunas, but has been collected also in British Columbia and Utah.

7. Mesostenus sicarius, new species

Front wing 4.5 to 8.0 mm. long; clypeus rather small, strongly convex, its apical margin weakly arcuate; temple short, moderately convex; prepectal carina sharp to near lower 0.3 of hind margin of

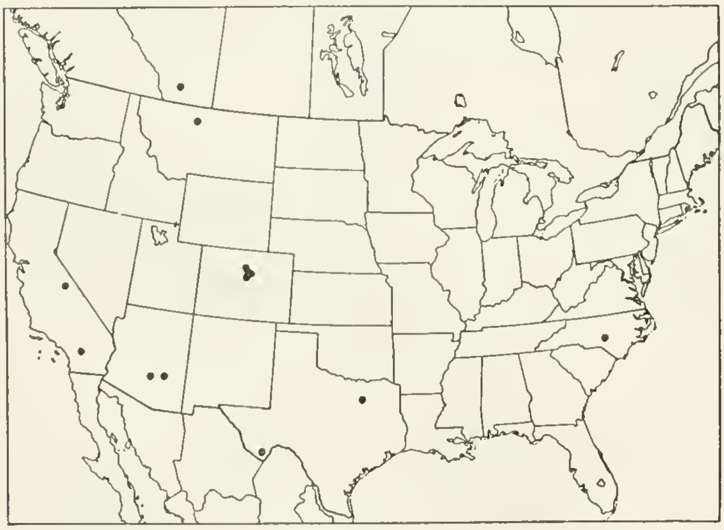


FIGURE 249.—Localities for *Mesostenus sicarius*.

pronotum, at this point ending at or becoming obsolete in a vertically elliptic, white, slightly raised callus; punctures on mesopleurum moderately coarse, strong, separated by about 0.25 their diameter; apical transverse carina of propodeum unusually close to apex of propodeum, rather weak, in the male usually with a brief median interruption, in the female with a moderately wide median interruption, its sublateral part rather strongly oblique and not elevated as a crest; areolet about 1.5 as wide as high; second tergite moderately mat, its punctures small, separated by about 1.5 their diameter; ovipositor sheath about 0.80 as long as front wing; ovipositor tip about 11.5 as long from nodus to apex as it is deep at nodus.

Male: Black. Face, cheek, and clypeus white except for a narrow oblique blackish mark over each clypeal fovea; orbit white except for an interruption on upper part of temple; mandible white; palpi pale brown, their first two segments largely white; flagellum rarely with an obscure dorsal whitish mark on one to three of its median segments; lower third of propleurum, upper and lower margins of pronotum, median spot on mesoscutum, basolateral carinae of scutellum, sides and apex of scutellum, postscutellum, tegula, subtegular ridge, usually a longitudinal mark on mesopleurum just above sternaulus, elliptic spot at upper end of prepectal carina (this often confluent with white mark on subtegular ridge and mark on lower part of mesopleurum), much or most of mesosternum, upper part of mesepimeron, and apical corner of metapleurum, white; mesopleurum often with a median ferruginous area; metapleurum varying from entirely ferruginous to entirely black; propodeum varying from black with an apicolateral ferruginous mark to mostly ferruginous with its base broadly infuscate; front and middle coxae and first trochanters white, the coxae dark brown basally and internally and the trochanters dark brown above; front and middle second trochanters, femora, and tibiae fulvous their tarsi brownish with the joints paler, darkest apically; hind coxa fulvoferruginous, often fuscous basally below and apically above; hind trochanters and femur fulvoferruginous, the trochanters more or less darkened above; hind tibia fuscous at base and above, the rest fulvous; hind tarsus fuscous, the extreme apex of segment 1, base and apex or all of segment 2, all of segment 3, and all or most of segment 4, white; wings hyaline; abdomen fulvoferruginous.

Female: Colored like the female of *M. thoracicus* except that the ground color is fulvoferruginous rather than fulvous, there is always a white mark at upper end of prepectal carina, often a short but broad oblique white stripe just above sternaulus (often joining with white mark at upper end of prepectal carina), usually a short but broad white stripe just below sternaulus, trochanters and front and middle coxae are often marked with fuscous, and front and middle coxae have the white markings averaging larger and more sharply defined.

Type: ♀, in Sonoran desert just north of Roosevelt Lake, Ariz., Apr. 21, 1947, H. and M. Townes (Washington, USNM 63829).

Paratypes (15♂, 16♀): From Alberta (Lethbridge); Arizona (Phoenix and near Roosevelt Lake); California (Bigpine Creek in Inyo Co. at 6,000 ft., and Fan Hill Canyon 10 miles northeast of Thousand Palms); Colorado (Inspiration Point near Denver, Lyons, Morrison, and White Rocks near Valmont); Montana (Marias River 20 miles south of Chester); North Carolina (Southern Pines); Texas (Dallas and 6 miles west of "Gov. Springs" in Big Bend National Park); and Mexico (Aguascalientes and Teotihuacan Pyramids).

Dates of collection are from late spring to mid-summer. The earliest and latest records are: April 6 at Dallas, Tex., and in Fan Hill Canyon, 10 miles northeast of Thousand Palms, Calif.; April 21 near Roosevelt Lake, Ariz.; April 30 at White Rocks, near Valmont, Colo.; July 6 at Lethbridge, Alta.; July 6 and 7 at Teotihuacan Pyramids, Mexico; and July 16 at "Gov. Springs" in Big Bend National Park, Tex.

There is one reared specimen: ♀, bred from cocoon in cactus stem, Aguascalientes, Mexico, December 3, 1909, E. A. Schwartz.

This species ranges through the drier, warmer areas of the United States, and southwestern Canada, and is found in Mexico. It has a spotty distribution which seems to be correlated with that of cactus (*Opuntia* spp.).

8. Mesostenus thoracicus Cresson

Mesostenus thoracicus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 314; ♂, ♀. Lectotype: ♀, Delaware (Philadelphia).

Mesostenus erythrogaster Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 406; ♂. Type: ♂, Wisconsin (Washington).

Front wing 5.5 to 8.5 mm. long; clypeus of moderate size, rather strongly convex, its apical edge rather weakly arcuate; thorax shorter and stouter than in any other species of the genus except *melanurus;* temple weakly convex; prepectal carina strong and sharp to upper 0.4 of hind margin of pronotum; punctures on mesopleurum moderately coarse, strong, those on its median part separated by about 0.25 their diameter, elsewhere a little sparser; apical propodeal carina of male strong, sharp, and complete, sublaterally elevated to form a weak crest; apical propodeal carina of female broadly interrupted medially, sublaterally elevated as a strong crest, the crest less oblique than in other species of the genus; areolet about 1.4 as wide as high; second tergite of female weakly mat, with medium-sized punctures that are separated by about 0.75 their diameter; ovipositor sheath about 0.60 as long as front wing; tip of ovipositor about 4.5 as long from nodus to apex as it is deep at nodus.

Male: Black. Face, cheek, clypeus, and broad orbits white, the white orbital mark interrupted on upper part of temple; mouth parts, front of scape, a rather long dorsal stripe on median part of flagellum (rarely obsolescent or absent), lower 0.3 of propleurum, upper and lower margins of pronotum, median spot on mesoscutum, basolateral carinae of scutellum, sides of scutellum, usually apex of scutellum, postscutellum, tegula, subtegular ridge, mesopleurum just above sternaulus, upper part of mesepimeron, most or all of mesosternum, and front and middle coxae and trochanters, white; median 0.3± of flagellum fulvous below; upper part of prepectus often whitish; mesopleurum fulvous except near tegula and sometimes in lower hind corner; metapleurum fulvous except below juxtacoxal carina; upper division of metapleurum fulvous; propodeum fulvous, basad of its basal carina more or less black, usually with a whitish tint apicad of its apical carina; front and middle femora and tibiae fulvous; front tarsus stramineous, its fifth segment brown; middle tarsus pale brown, paler at the joints and darker apically; hind coxa, trochanters, and femur fulvous, the trochanters partly brownish above, apex of coxa sometimes infuscate above, and extreme apex of femur fuscous; hind tibia fuscous, with a broad, poorly defined, subbasal fulvous band; hind tarsus white, the basal 0.15 to 0.4 of its first segment and tip of its fifth segment black; wings hyaline; abdomen fulvous.

Female: Black. Broad orbits, clypeus, and median quadrate spot on face white, these white areas often more or less fused, the orbits interrupted on upper part of temple; mandible except for its apex and margins, palpi, median incomplete band on flagellum that covers about 5 segments, upper and lower margins of pronotum, median spot on mesoscutum, basolateral carinae of scutellum, sides and usually apex of scutellum, postscutellum, tegula, and subtegular ridge, white; lower end of propleurum fulvous or whitish; prepectus black, its dorsal extension fulvous; mesopleurum fulvous, black behind subtegular ridge; mesosternum fulvous, black medially and next to middle coxa; metapleurum and propodeum fulvous, the extreme base of propodeum black; front and middle legs fulvous, their first trochanters and outer side of their coxae whitish, their fifth tarsal segments brown; hind leg fulvous, the base of its first trochanter dark brown, the extreme apex of its femur somewhat infuscate, its tibia fuscous basally, and its tarsus whitish fulvous with the base of its first segment fulvous and its fifth segment brown; wings hyaline; abdomen fulvous.

Specimens from west of the Rocky Mountains have the blackish markings usually a little more extensive than described above and the male flagellum often entirely black.

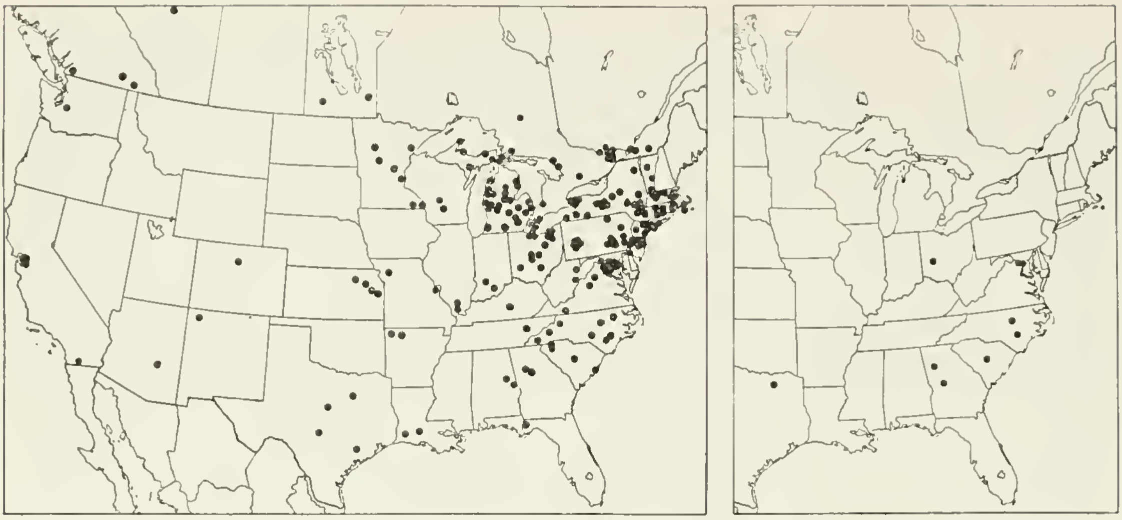
Specimens (305♂, 329♀): From Alabama (Langdale and Pyriton in Clay Co.); Alberta (Edmonton); Arizona (Parker Creek in Sierra Ancha); Arkansas (Bentonville and Marble Falls); British Columbia (Creston, Mission City, and Robson); California (Antioch, Jacumba, Mount Diablo, and Niles Canyon); Colorado (Boulder); Connecticut (Colebrook, East River, Lyme, and Storrs); Delaware (New Castle Co.); District of Columbia (Georgetown and Washington); Florida (Torreya State Park); Georgia (Atlanta and Stone Mt.); Illinois (Carbondale and Giant City State Park in Union Co.); Indiana (Bolten Orchard at Linton and Crawford Co.); Kansas (Baldwin, Lawrence, Miami Co., and Onaga); Kentucky (Greene Co.); Louisiana (Lake Charles and Opelousas); Manitoba (Aweme and Natalie Lake); Maryland (Bowie, Cabin John, College Park, Glen Echo, Hall, Mayo, Plummers Island, and Takoma Park); Massachusetts (Amherst, Blue Hills, Forest Hills, Holliston, Martha's Vineyard, Mount Toby, Williamstown, Winchendon, and Woods Hole); Michigan (Alcona Co., Alger Co., Alto, Ann Arbor, Brampton, Branch Co., Brevort, Chippewa Co., Clare Co., East Lansing, Empire, Genesee Co., George Reserve in Livingston Co., Huron Mts., Iosco Co., Isabella Co., Keweenaw Co., Lake Co., Manistee Co., Mason Co., Mecosta Co., Midland Co., Montcalm Co., Muskegon Co., Naubinway, Oakland Co., Oceana Co., Roscommon Co., St. Clair Co., Sanilac Co., and Warren Woods in Berrien Co.); Minnesota (Alexandria, Fillmore Co., Houston Co., Itasca Park, Mille Lacs Co., Ramsey Co., and St. Louis Co.); Missouri (Atherton and Overland); New Jersey (Moorestown, New Lisbon, Pemberton, Ramsey, Riverton, Toms River, and Washington); New Mexico (Farmington at 5,250 ft.); New York (Babylon, Bemus Point, Coram, Dix Hills on Long Island, Farmingdale, Greene Co., Ithaca, Keene Valley, Lexington, McLean, McLean Reservation, New Baltimore, Niagara Falls, Nyack, Oliverea in the Catskills, Oneonta, Poughkeepsie, Rockaway, Rockaway Beach, Rome, Sea Cliff, Shokan, Staten Island, Syracuse, Taughannock Falls, Taughannock Gorge, Troy, West Farms in New York City, and Whitesville); North Carolina (Black Mts. at 5,000 ft., Blowing Rock, Elizabethtown, Franklin, Garland, Raleigh, Rocky Mount, and Southern Pines); Ohio (Akron, Bedford, Brecksville, Catawba Island, Cedar Point, Cleveland, Columbus, Delaware Co., Hocking Co., Licking Co., Montgomery Co., Puritas Springs in Cuyahoga Co., Sandusky, Put-in-Bay on South Bass Island, and Wooster); Ontario (Bells Corners, Biscotasing, Bobcaygeon, Bothwell, Chatham, Dow's Swamp near Ottawa, Go Home Bay, Grand Bend, Jordan, Leamington, Little Rapids, Niagara Glen, Ottawa, Pelee Island, Point Pelee, Ridgeway, Rockcliffe, and Waubamick); Pennsylvania (Allegheny Co., Camp Hill, Glenside, Guyasuta Run near Pittsburgh, Heckton Mills, Inglenook, Ingram, Lancaster Co., Lehigh Gap, New Cumberland, Philadelphia, Pittsburgh, Pottstown, Presque Isle in Erie Co., Rockville, Sample Station, Allegheny Co., Spring Brook, Swarthmore, Wilawana, and York Co. near Highspire); Quebec (Ayers Cliff, Aylmer, Chambly Co., Hull, Montreal, Norway Bay, and Wakefield); Rhode Island (Buttonwoods and Westerly); South Carolina (Columbia, Greenville, McClellanville, and Tigerville); Tennessee (Knoxville); Texas (Dallas, Gustine, Kerrville, and Wharton Co.); Vermont (Laurel Lake near Jacksonville, Stowe, and Woodstock); Virginia (Chain Bridge, Difficult Run, Dyke, Falls Church, Galax, Glencarlyn, Great Falls, Herndon, Pimmit Run, and Stony Man); Washington (Ashford); West Virginia (Bolivar, Cheat Mt. at 2,000 ft., and Philippi); and Wisconsin (Juneau Co., and Sauk Co.).

Dates of collections are from late spring to mid-fall. Unusually early and late seasonal records are: April 17 at Elizabethtown, N.C.; April 21 at Mount Diablo, Calif.; April 25 at Knoxville, Tenn.; May 2 at Boulder, Colo., at Marble Falls, Ark., and at Takoma Park, Md.; May 8 at Ithaca, N.Y.; May 10 at Swarthmore, Pa.; May 18 at Ithaca, N.Y., at Amherst, Mass., and at Forest Hills, Mass.; October 15 in Oceana Co., Mich.; October 18, 23, and 31 and November 1 at Takoma Park, Md.; October 20 in Montgomery Co., Ohio; October 23 at Farmington, N. Mex.; October 28 at Difficult Run, Va.; November 3 at Lake Charles, La.; and November 8 at Southern Pines, N.C.

Reared specimens are as follows: ♂, from *Acrobasis betulella*, Biscotasing, Ont., July 21, 1948. ♀, from from *Acrobasis betulella*, Williamstown, Mass., Aug. 8, 1940. ♂, from *Acrobasis betulella*, locality illegible, August 10, 1950. ♀, from *Acrobasis betulella*, Little Rapids, Ont., July 16, 1948. ♂ from *Acrobasis "caryaevorella,"* Gustine, Tex., May 25, 1939, W. C. Pierce. 2♂, from *Acrobasis* sp. on *Carya*, East River, Conn., June 1, 1921, C. R. Ely. ♂, from *Acrobasis* sp., Natalie Lake, Man., July 22, 1952. 3♂, 2♀, from *Phlyctaenia extricalis*, Herndon, Va., Aug. 21 and 28, 1912, J. F. Strauss. ♀, from *Pyrausta theseusalis*, New Lisbon, N.J., July 18, 1930, E. P. Darlington. ♂, from *Tetralopha robustella*, Sauk Co., Wis., June 19, 1957, Wallesz. ♂, from *Mineola* sp., Bentonville, Ark., June 21, D. Isely.

The characteristic habitat is mesophytic or dry deciduous woods, in the understory or among shrubs.

This species occurs throughout the United States and southern Canada. It is most common in the eastern half of the continent.



Figures 250, 251.—Localities: 250 (left), *Mesostenus thoracicus;* 251 (right), *M. eisenii.*

9. Mesostenus eisenii Ashmead

Figure 337,d

Mesostenus eisenii Ashmead, 1894, Proc. California Acad. Sci., ser. 2, vol. 4, p. 129; ♀. Type: ♀, "El Taste," Baja California, Mexico, 3,400 ft. (San Francisco).

Front wing 5.8 to 6.7 mm. long; clypeus wide, rather strongly convex but its apical half flattened or a little impressed, its apical margin straight; temple rather short and strongly convex; dorsal end of prepectal carina near midheight of pronotum; punctures on mesopleurum coarse and strong, separated by about 0.4 their diameter; apical carina of propodeum complete, in the female a little raised sublaterally to form weak crests, between the crests strongly bowed forward; areolet square, about as wide as high; second tergite of female subpolished, with small, sparse punctures that are separated by about 5.0 their diameter; ovipositor sheath about 6.4 as long as front wing; tip of ovipositor about 5.7 as long from nodus to apex as it is deep at nodus.

Male: Head, body, and hind coxa marked with black, ivory, fulvous, and fuscous as in figure 337,d; mouth parts white; antenna black, the scape often brown in front and flagellum with a median dorsal white stripe that covers about 4 segments; front and middle coxae and trochanters ivory with fulvous areas or tinges; front and middle legs beyond trochanters fulvous, their fifth tarsal segments brown; hind trochanters, femur, and tibia fulvous, the tibia infuscate dorsally; hind tarsus fuscous, paler at the joints, its third segment sometimes whitish; wings hyaline.

Female: Colored like female of *M. thoracicus* except as follows: Face blackish, white next to eyes; entire prepectus and area below and in front of subtegular ridge black; postscutellum fulvous or ivory with a fulvous stain.

Specimens: ♂, Washington, D.C., Sept. 31, 1951, G. F. Townes (Townes). ♀, Atlanta, Ga., Sept. 23, 1941, P. W. Fattig (Washington). ♀, Roberta, Ga., Sept. 13, 1951, P. W. Fattig (Townes). ♂, Takoma Park, Md., Oct. 13, 1945, H. and M. Townes (Townes). 2♂, Faison, N.C., Sept. 25 and Oct. 3, 1951, H. F. Howden (Ottawa and Townes). ♂, Wake Co., N.C., Sept. 8, 1951, H. and M. Townes (Townes). ♂, Wake Co., N.C., Oct. 14, 1950, H. K. Townes (Townes). ♀, Montgomery Co., Ohio, Oct. 20, 1943, F. D. De Gant (Columbus). ♀, Columbia, S.C., June 6, 1951, G. F. Townes (Townes). ♀, Hunt Co., Tex., Oct. 10, 1937 (Townes). ♀, Acayucuan, Veracruz, Mex., Oct. 23, 1957, R. and K. Dreisbach (Dreisbach). ♀, Hueyapan, Mex., Oct. 30, 1957, R. and K. Dreisbach (Dreisbach).

This species occurs in the Carolinian and Austroriparian faunas, and in Mexico.

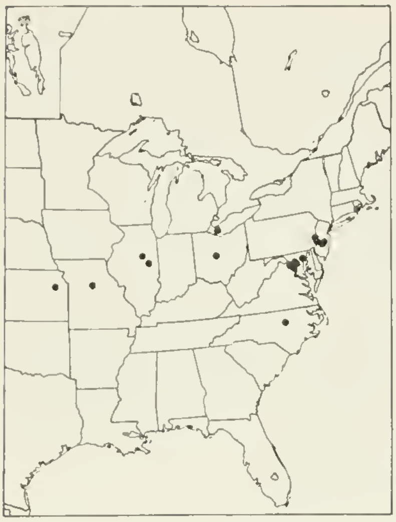
10. Mesostenus angustus Townes

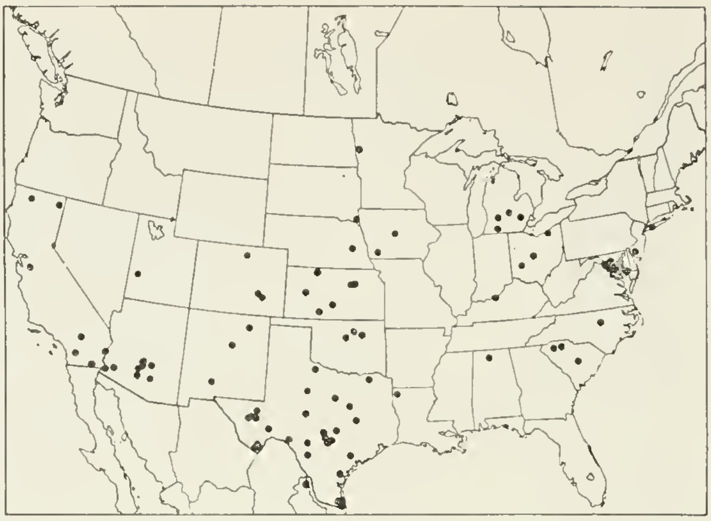
FIGURES 337,e,f

Mesostenus leucopus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 406; ♂. Name preoccupied by Brullé, 1846. Type: ♂, Normal, Ill. (Washington).
Mesostenus angustus Townes, 1944, Mem. Amer. Ent. Soc., vol. 11, p. 284. New name.

Front wing 5.7 to 7.0 mm. long; clypeus wide, rather strongly convex, its apical margin weakly arcuate, almost straight; temple short but strongly convex; dorsal end of prepectal carina near midheight of pronotum; punctures on lower half of mesopleurum moderately coarse and strong, separated by about 0.5 their diameter; apical carina of propodeum complete and uniformly strong, bowed forward a little at center; second hind trochanter about 0.5 as long as first hind trochanter (both trochanters measured on dorsal edge, where first trochanter is longest and second trochanter shortest, the second hind trochanter of all other Nearctic species except *longicaudis* less than 0.35 as long as first hind trochanter); areolet about 1.5 as wide as high; second tergite of female subpolished, with small, rather weak punctures that are separated by about 6 times their diameter; ovipositor sheath about 0.80 as long as front wing; tip of ovipositor about 6.8 as long from nodus to apex as it is deep at nodus.

Male: Head and thorax black and white as in figure 337,e; palpi whitish; antenna black, the scape with a small apical whitish spot in front; front and middle legs fulvous, the front coxa except basally, most of front trochanters, usually middle coxa in front, and usually middle trochanters in front, white; fifth segments of front and middle tarsi brown; hind coxa fulvoferruginous; hind first trochanter brown, paler apically and below; hind second trochanter and hind femur fulvous brown, darker brown above; hind tibia blackish brown, a little paler subbasally; hind tarsus white, the basal 0.3± of its first segment





Figures 252, 253.—Localities: 252 (left), *Mesostenus angustus;* 253 (right), *M. longicaudis.*

and all of fifth segment fuscous; wings hyaline; abdomen fulvoferruginous, the postpetiole brownish except apically, basal 0.6± of second tergite brown, and basal 0.4± of third and following tergites brown.

Female: Head and thorax black and white as in figure 337,f; flagellum with an incomplete median white band that covers about 5.5 segments; legs fulvous, the front coxa and trochanters mostly whitish and fifth tarsal segments tinged with brown; wings hyaline; abdomen fulvous.

Specimens (8♂, 18♀): From District of Columbia (Washington); Illinois (Mahomet); Kansas (Lawrence); Maryland (Baltimore, Glen Echo, and Takoma Park); Missouri (Columbia); New Jersey (Haddon Heights and Moorestown); North Carolina (Raleigh); Ohio (Columbus and North Bass Island); Pennsylvania (Gladwyn and Willow Grove); Rhode Island (Westerly); and Virginia (Great Falls and Rosslyn).

Dates of collections are from early to late summer. The earliest and latest records are: June 8 at Lawrence, Kans.; June 15 at Washington, D.C.; September 11 at Takoma Park, Md.; and September 12 at Great Falls, Va., and at Columbia, Mo.

This species occurs in the Carolinian fauna.

11. Mesostenus longicaudis Cresson

Figure 337,g

Mesostenus longicaudis Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 164; ♀. Type: ♀, Bosque Co., Tex. (Washington).

Mesostenus macilentus Cresson, 1878, Canadian Ent., vol. 10, p. 210; ♂. Lectotype: ♂, Louisiana (Philadelphia).

Mesostenus gracilipes Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 365; ♀. Type: ♀, California (Philadelphia).

Coleocentrus texanus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 444; ♀. Lectotype: ♀, Texas (same specimen as type of *Mesostenus longicaudis*, Washington).

Mesostenus macrurus Dalla Torre, 1901, Catalogus hymenopterorum, vol. 3, p. 544. New name for *M. longicaudis*.

Nematopodius exclamans Viereck, 1905, Trans. Kansas Acad. Sci., vol. 19, p. 318; ♀. Type: ♀, Clark Co., 1,962 ft., Kans. (Lawrence).

Front wing 4.5 to 9.3 mm. long; clypeus very wide, rather strongly convex, its apical margin almost straight; temple strongly convex; prepectal carina sharp dorsad to just above midheight of pronotum, more dorsad obsolescent or absent; punctures on mesopleurum rather small, separated by about 1.5 their diameter; apical carina of male propodeum complete, of even strength throughout, its central portion bowed forward; apical carina of female propodeum complete, thin but sharp, in some places often irregular or almost obsolete, its central part extending far forward; second hind trochanter about 1.2 as long as first hind trochanter (both trochanters measured on dorsal edge, where first trochanter is longest and second trochanter shortest, the second hind trochanter of all other Nearctic species except *angustus* less than 0.35 as long as first hind trochanter); areolet about 2.2 as wide as high; second tergite of female subpolished, with small, weak punctures that are separated by about 7 times their diameter; ovipositor sheath about 3.2 as long as front wing; tip of ovipositor narrowly lanceolate, about 4.2 as long from nodus to apex as it is deep at nodus.

Male: Black. Head and thorax marked with pale yellow as in figure 337,g, the marks on mesopleurum of variable size, sometimes confluent as an oblique stripe and sometimes the front spot lacking; palpi yellowish to pale brown; scape often ferruginous or yellow in front; flagellum black; front and middle legs fulvous, their fourth and fifth tarsal segments brown; hind coxa, trochanters, and femur fulvous, the coxa with a whitish area dorsally and first trochanter fuscous above; hind tibia brownish fulvous, brown at base and toward apex; segments 1, 4, and 5 of hind tarsus dark brown; segments 2 and 3 of hind tarsus whitish, brown apically or on apex; wings subhyaline to light brown; abdomen fulvous.

Female: Ferruginous. Flagellum blackish, fulvous basally, with an incomplete median white band that covers about 4 segments; area above wing bases and thoracic sterna more or less infuscate; tarsi brown apically; wings light yellowish brown to medium brown.

Specimens from California tend to have the whitish markings of the male reduced, white mark on flagellum of female reduced or absent, fuscous markings on thorax enlarged, coxae and all first trochanters of male partly black, and wings darker than usual. This tendency toward darker coloration is at its extreme in a male and a female from Mount Hamilton in Santa Clara Co., Calif.

Specimens (76♂, 118♀): From Alabama (Decatur); Arizona (Buckeye, Eloy, Palo Verde, Perryville, Phoenix, Roll, Theba, and Yuma); California (Calexico, Cedarville, Daggett, Escondido, Gazelle, Mount Hamilton, and Ripley); Colorado (Crowley, Fort Collins, and Rocky Ford); District of Columbia (Washington); Iowa (Ames and Shenandoah); Kansas (Clark Co. at 1,950 ft., Manhattan, Phillips Co. at 1,940 ft., Pratt Co. at 1,950 ft., Riley Co., and Scott Co.); Kentucky (Louisville); Louisiana (Shreveport in Upper Red River Valley); Maryland (Cabin John, Dorchester Co., and Marshall Hall); Michigan (East Lansing, Kalamazoo Co., Milford, and Nottawa); Minnesota (Halstad); Nebraska (Lincoln); New Jersey (Bridgeton); New Mexico (Cimarron, Las Cruces, and Moriarty); New York (Babylon); North Carolina (Raleigh); Ohio (Cleveland, Columbus, and Montgomery Co.); Oklahoma (Pawnee, Stillwater, and Tulsa); South Carolina (Columbia, Greenville, and Moore); South Dakota (Elk Point); Texas (Austin, Blanco Co., Brownsville, Castolon in Big Bend National Park at 2,000 ft., Chillocothe, Corpus Christi, Cotulla, Davis Mts., Del Rio, Eastland Co., 15 miles west of Fort Davis, Fort Sam Houston, Harlingen, Headquarters of Big Bend National Park at 3,500 ft., Kerrville, Paris, Pecos, Point of Rocks near Fort Davis, Salado Creek in Bexar Co., San Angelo, San Antonio, Sanderson, Stamford, Tornillo Flats in Big Bend National Park at 2,500 ft., Victoria, Waco to College Station, and Winter Haven); Utah (Milford); Virginia (Falls Church and Leesburg); and Mexico (10 miles south of Nuevo Laredo, Tehuacan in Puebla, and Teotihuacan Pyramids).

Dates of collections are from mid-spring to mid-fall. In the southern part of the range the collection records are throughout the growing season, but in the northern part they begin in early July and extend to mid-fall. It might be that the species survives the winter only in Lower Austral areas and moves northward in the latter part of each season. Some unusually early seasonal records are: March 9 at Harlingen, Tex.; March 12 and 21 at Salado Creek, Bexar Co., Tex.; March 24 at Fort Sam Houston, Tex.; April 4 at Stillwater, Okla.; April 16 at Rocky Ford, Colo.; May 6 at Tulsa, Okla.; May 22 in Riley Co., Kans.; July 3 at Falls Church, Va.; July 6 at East Lansing, Mich.; and July 14 at Raleigh, N.C. Unusually late records are: September 25 at Milford, Mich.; October 11 at Greenville S.C.; October 15 at Ames, Iowa; October 25 at Lincoln, Nebr.; November 2 at Buckeye, Ariz., and at Palo Verde, Ariz.; and December 22 ten miles south of Nuevo Laredo, Mexico. The earliest and latest dates for California are: June 19 at Escondido and October 17 at Daggett.

There is one reared lot: 2♂, 1♀, from *Loxostege sticticalis*, Rocky Ford, Colo., Apr. 16, 18, and 24, 1921, C. E. Mickel.

The characteristic habitat is weedy vegetation in full sunlight.

This species is transcontinental in the Upper and Lower Austral zones and ranges southward into Mexico.

29. Genus Polycyrtus

FIGURE 322,b

Polycyrtus Spinola, 1840, Ann. Soc. Ent. France, vol. 9, p. 154. Type: *Polycyrtus histrio* Spinola; designated by Viereck, 1914.

Cryptanuridimorpha Viereck, 1913, Proc. U.S. Nat. Mus., vol. 46, p. 369. Type: *Cryptanuridimorpha elegans* Viereck; original designation.

Cryptopterigimorpha Viereck, 1913, Proc. U.S. Nat. Mus., vol. 46, p. 371. Type: *Cryptopterigimorpha tubulifera* Viereck; original designation.

Polycyrtimorpha Viereck, 1913, Proc. U.S. Nat. Mus., vol. 46, p. 383. Type: *Polycyrtimorpha amoena* Viereck; original designation.

Front wing 5.0 to 13.5 mm. long; body quite slender; frons with a median conical horn; mesoscutum rather strongly convex, polished, practically impunctate but with a few fine, weak punctures; notaulus very strong, reaching far beyond middle of mesoscutum; epomia usually absent or very short and blunt, but sometimes moderately long and sharp; prepectal carina variable, sometimes ending near lower corner of pronotum but usually farther dorsad, sometimes at the subtegular ridge; propodeum long, its basal carina strong and complete, its apical carina represented by a pair of sublateral horns that are usually long and somewhat curved but may be short or represented only by low rounded tubercles, the rest of apical carina usually absent but sometimes traceable between the horns; in one species group the apical carina is relatively complete and unmodified and forms sublateral crests rather than horns; propodeal spiracle elongate elliptic; areolet small or very small, rectangular, wider than high, usually about 1.6 as wide as high; ramellus absent; nervulus usually a little basad of basal vein but sometimes opposite it; base of second discoidal cell broad; mediella moderately arched; nervellus broken below the middle; axillus short, close to anal margin; first abdominal segment moderately long, with a subbasal lateral point, its spiracle near its apical 0.40, without longitudinal carinae, the apex of its sternite distad of the spiracle; second tergite polished, almost impunctate but with moderately sparse to very sparse, fine, weak, setiferous punctures; tergite 7 without a median white spot but often margined with white; ovipositor sheath about 0.53 as long as front wing; ovipositor moderately slender, somewhat compressed, its apical point with a long taper.

Polycyrtus is a very large genus. There is, however, only one Nearctic species. All the rest are Neotropic.

Polycyrtus neglectus Cushman

Figure 338,a

Polycyrtus neglectus Cushman, 1926, Proc. U.S. Nat. Mus., vol. 67, art. 23, p. 5; ♂, ♀. Type: ♀, Cabin John, Md. (Washington).

Front wing 6.5 to 9.5 mm. long.

Head and body variegated with black, white, and pale fulvous as in figure 338,a; antenna black, the flagellum with a broad white band; palpi white; mesoscutum with a median pair of stripes; legs fulvous, somewhat varied with pale fulvous, the hind coxa often with a very narrow longitudinal fuscous stripe above, the tarsi brownish at apex.

Specimens (92♂, 87♀): From Alabama (Coleta, Coosa River in Chilton Co., Langdale, and Pyriton in Clay Co.); District of Columbia (Washington); Florida (Orlando and Paradise Key); Georgia (Pine Mountain in Rabun Co. at 1,400 ft.); Kentucky (Cadiz and Crailhope); Maryland (Bowie, Cabin John, Frederick, Great Falls, Perry Hall, Plummers Island, Ruxton, and Takoma Park); Massachusetts (South Hadley); Michigan (Ann Arbor, George Reserve in Livingston Co., Muskegon Co., and Van Buren Co.); New Jersey (Moorestown); New York (Ithaca and Greene Co.); North Carolina (Crabtree Meadows in Yancey Co. at 3,600 ft., Crestmont in Haywood Co. at 2,500 ft., Elizabethtown, Nantahala Gorge at 2,000 ft., Mount Pisgah at 3,000 ft., Raleigh, and Smokemont in Great Smoky Mountains National Park); Ohio (Cantwell Cliffs, Cleveland, Columbus, and Vinton Co.); Oklahoma (Flint); Pennsylvania (Castle Rock in Delaware Co., Crisp in Westmoreland Co., Ohiopyle, and Pittsburgh); Rhode Island (Westerly); South Carolina (Columbia, Greenville, McClellanville, and near Tigerville); Tennessee (East Ridge, Gatlin-

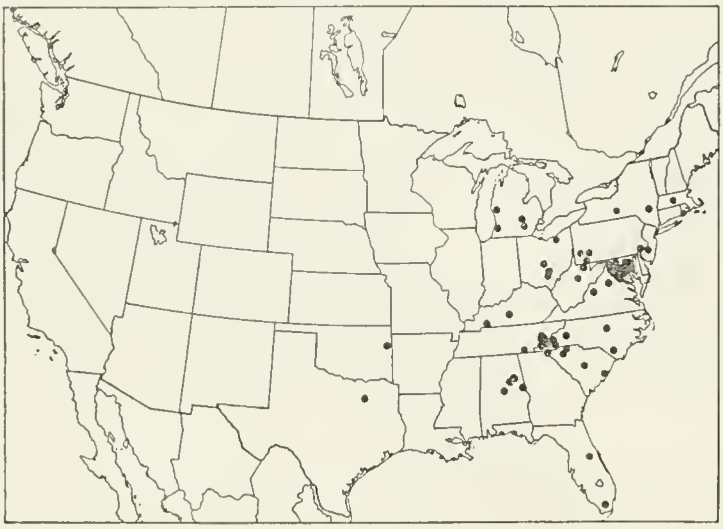


Figure 254.—Localities for *Polycyrtus neglectus.*

burg, Little River on Sugarland Mt. in Great Smoky Mountains National Park, and at Headquarters of Great Smoky Mountains National Park); Texas (Dallas); Virginia (Chain Bridge near McLean, near Culpeper, Dayton, Dixie Landing, Falls Church, Glencarlyn, Great Falls, Mount Vernon, and Rosslyn); and West Virginia (Bolivar, Cheat River, and Jackson Mill in Lewis Co.).

Collection dates are from late spring to early fall. Unusually early and late seasonal records are: February 22 at Paradise Key, Fla.; "March" at Orlando, Fla.; April 17 at Dallas, Tex.; May 2 at Glencarlyn, Va.; May 4 at Cantwell Cliffs, Ohio; May 6 at East Ridge, Tenn.; June 7 at South Hadley, Mass.; September 23, 25, and 26 at Bolivar, W. Va.; October 10 and 13 at Plummers Island, Md.; and October 15 at Takoma Park, Md.

We find the species in heavy undergrowth of moist deciduous woods, particularly in stream bottoms.

This species occurs in the Carolinian, Austroriparian, and Tropical faunas.

3. SUBTRIBE NEMATOPODIINA

Clypeus wide, rather weakly convex, its apical margin broadly truncate or weakly arcuate, without a median tooth or lobe; mandible about 4.5 as long as it is wide at middle, strongly narrowed from base and slender apically, its upper tooth much longer than lower tooth, the lower tooth sometimes weak or absent, the lower margin of mandible usually prominent and bowed outward; flagellum rather slender, ending in a rounded point; thorax and propodeum rather short to rather long; basal transverse carina of propodeum sharp and complete; apical transverse carina of propodeum complete, incomplete, or often absent, never with a sublateral crest or tooth; propodeal spiracle short elliptic to elongate; front tibia of female not inflated; fourth tarsal segments of female cylindric or somewhat compressed, with a few weak bristles at apex, not bilobed; areolet varying from large to very small, pentagonal or quadrangular, sometimes a little longer than high, when small its apex sometimes open; first tergite weakly expanded apically, sometimes almost parallel sided, its spiracle at or behind the middle; female subgenital plate not unusually large and sclerotized; ovipositor moderately short to long, usually cylindric, its apex usually either with coarse teeth on dorsal valve or with the tip depressed and the tips of the lower valves enclosing the upper valve.

This group includes genera that, so far as known, are parasitic in the nests of wasps making mud nests, including vespids, psammocharids, and sphecids. There are two Nearctic genera.

Key to the Nearctic genera of Nematopodiina

1. Areolet small (fig. 323,a); spiracle of first tergite at the middle; cheek about 0.3 as long as basal width of mandible . . . . **1. Messatoporus** (p. 462)

Areolet large (fig. 323,b); spiracle of first tergite near its apical 0.38; cheek about 0.8 as long as basal width of mandible . . . **2. Acroricnus** (p. 468)

1. Genus Messatoporus

Figure 323,a

Messatoporus Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 8. Type: *Mesostenus discoidalis* Cresson; original designation.

Front wing 4.8 to 12.5 mm. long; cheek about 0.3 as long as basal width of mandible; occipital carina complete or its lower end not quite reaching the hypostomal carina; apical carina of propodeum absent; propodeum beyond the basal carina transversely wrinkled, the wrinkling often forming a weak pair of sublateral crests; last segment of hind tarsus without strong bristles at the middle of its underside; areolet small, almost square; first abdominal segment slender, very little widened apically, its spiracle at the midlength; ovipositor tip depressed, in dorsal view weakly sagittate, the tips of ventral valves enclosing tip of dorsal valve, their teeth varying from coarse and blunt to fine curved ridges.

Messatoporus is a rather large genus, but with only three species in our fauna. The rest are Neotropic. All species are probably parasitic in nests of mud wasps. Rearing records are available for only *M. discoidalis* and *M. rufiventris*. These parasitize *Auplopus* and *Phanagenia* (both Psammocharidae, tribe Macromerini).

Key to the Nearctic species of Messatoporus

1. Apical part of antenna compressed, the last 8± segments being about twice as deep as wide; hind half of mesoscutum with almost no hairs; middle and hind coxae white, striped with black; clypeus with its apical half quite flat. **3. compressicornis** Cushman

Apical part of antenna subcylindric; hind half of mesoscutum with moderately dense hairs; middle and hind coxae light fulvous, usually whitish dorsally, the hind coxa usually with a dorsal fuscous stripe, the middle coxa rarely with an apical fuscous spot; clypeus rather evenly convex. 2

2. Median white spot on mesoscutum subcircular, without a white stripe extending forward along lateral margin of the median lobe; abdomen usually fulvous or whitish fulvous, more or less banded with fuscous, but never so sharply banded with black and white as in *M. discoidalis;* oblique groove setting off upper hind corner of mesopleurum without transverse wrinkles; basal 0.08± of hind tibia a little darker than subbasal portion; thyridium on second tergite about 0.4 as wide as long . . . . **1. rufiventris** Cushman

Median white spot on mesoscutum usually with a thin white stripe extending forward along lateral edge of median lobe; abdomen sharply banded with black and white; oblique groove setting off upper hind corner of mesopleurum with some fine weak transverse wrinkles; basal 0.08± of hind tibia not distinctly darker than the subbasal portion; thyridium of second tergite about 0.6 as wide as long . . . . **2. discoidalis** (Cresson)

1. Messatoporus rufiventris Cushman

FIGURE 338,b

Messatoporus rufiventris Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 11; ♀. Type: ♀, Cabin John, Md. (Washington).

Front wing of male 4.8 to 6.4 mm. long, of female 6.0 to 7.2 mm. long; apical half of clypeus about as convex as basal half; apical part of flagellum subcylindric, not distinctly compressed; mesoscutum with moderately dense hairs all over; mesopleurum and metapleurum polished or subpolished, with small punctures that are separated by about 2.0 their diameter, the oblique groove setting off upper hind corner of mesopleurum without any wrinkles; thyridium of second tergite about 0.4 as wide as long.

Male: Colored like the female except that front and middle legs are paler, fuscous mark on upper side of hind coxa usually larger, hind trochanters often infuscate, infuscation on hind tibia more extensive and stronger, last segment of hind tarsus sometimes entirely white, and abdomen more contrastingly banded with fuscous, in this respect approaching the coloration of *M. discoidalis.*

Female: Head, body, and hind coxa marked with black, white and fulvous as in figure 338,b, the coloration of abdomen variable as discussed below; palpi white; scape white except above; flagellum with a broad white band; mesoscutum with a median white spot that is subcircular but truncate in front; front and middle coxae and trochanters whitish, the middle ones more or less pale fulvous; front legs stramineous, the femur fulvous above and often with a weak fuscous stripe above, the last segment of tarsus pale brown; middle leg beyond

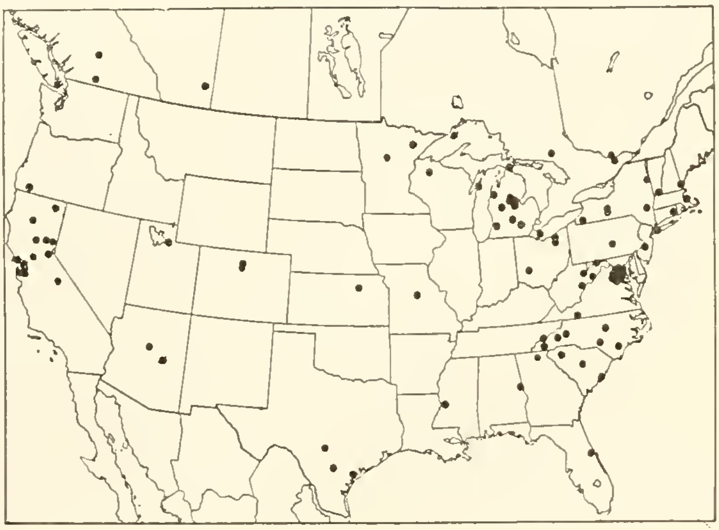


FIGURE 255.—Localities for *Messatoporus rufiventris.*

trochanters pale fulvous, the tibia and tarsus palest, the last segment of tarsus brown; hind trochanters and femur light fulvous; hind tibia light fulvous, its basal 0.08± brownish fulvous, its apical 0.65± progressively infuscate toward apex, the apical 0.25± quite dark; hind tarsus white, the basal 0.25± of first segment and apical 0.4 of last segment, fuscous.

The coloration figured and described is the one typical for the Alleghanian and Carolinian faunas. In specimens from the Canadian zone and cooler parts of the Transition zone there is usually an increase of both infuscation and of fulvous, the fulvous tinging parts of the pleura, and the hind coxa more completely fulvous. In these specimens there is often a pair of fuscous sublateral stripes on the face of the female. In females from the Rocky Mountains and westward the abdomen is usually more contrastingly banded with fuscous, to produce individuals quite similar in appearance to *M. discoidalis*. In the Sonoran fauna the infuscation of the hind tibia is usually more intense and sharply defined, and the apex of the femur of the male is often fuscous.

There are several forms in the Neotropic region which are very close to this Nearctic species, and it seems probable that larger collections and further studies will show that some of them are only subspecifically distinct from it.

Specimens (71 ♂, 104♀): From Alabama (Langdale); Alberta (Medicine Hat); Arizona (Oak Creek Canyon and Parker Creek in Sierra Ancha); British Columbia (Enderby, Oliver, and Victoria); California (Anderson in Shasta Co., Camino, Cedar Pass in Modoc Co., Davis, Enterprise in Butte Co., Fish Camp, Hamilton City, Leona Heights, Menlo Park, Mill Valley, Oakland, San Jose, and Sierraville); Colorado (Boulder and Lyons); Connecticut (Lebanon); District of Columbia (Washington); Florida (Winter Park); Georgia (Holcomb Creek in Pickens Co.); Kansas (Riley Co.); Maryland (Bowie, Cabin John, College Park, Glen Echo, Plummers Island, shore of Potomac near Nanjemoy, Takoma Park, and Thomas Road near Cumberland); Massachusetts (Humarock); Michigan (Ann Arbor, Clare Co., East Lansing, Gladwin Co., Isle Royale, Mackinac Island, Manistee Co., Midland Co., Montcalm Co., Roscommon, and Van Buren Co.); Minnesota (Itasca Park and Virginia); Mississippi (Vicksburg); Missouri (Columbia); New Hampshire (Durham); New Jersey (Moorestown); New York (Bemus Point, Farmingdale, Greene Co., Ithaca, Ludlowville, and Shelving Rock on Lake George); North Carolina (Andrews at 1,800 ft., valley of Black Mts., Crabtree Meadows in Yancey Co. at 3,600 ft., Raleigh, Southern Pines, and Wallace); Ohio (Hinckley, Montgomery Co., Puritas Springs, and Put-in-Bay on South Bass Island); Ontario (Ottawa and Sudbury); Oregon (Siskiyou Pass in Jackson Co. at 4,500 ft.); Pennsylvania (Speeceville); Quebec (Aylmer); South Carolina (Columbia, Greenville, and McClellanville); Tennessee (Smoky Mts.); Texas (Kerrville, San Antonio, and Victoria); Utah (Farmington); Vermont (Laurel Lake near Jacksonville); Virginia (Dunn Loring, Falls Church, Galax, Glencarlyn, and Mount Vernon); West Virginia (Cheat Mt. at 2,000 ft. in Randolph Co., Cheat River, and Lost River State Park in Hardy Co.); and Wisconsin (Door Co. and Sawyer Co.).

Collection dates are rather evenly distributed from mid-spring to mid-fall. Early and late dates of interest are: March 5 at San Jose, Calif.; March 11 at Vicksburg, Miss.; April 16 at Takoma Park, Md.; May 9 at Raleigh, N.C., and at Boulder, Colo.; May 18, 20, and 24 at Ithaca, N.Y.; September 16 in Montcalm Co., Mich.; October 22 at Plummers Island, Md.; and October 31 at Southern Pines, N.C.

Reared specimens are as follows: 2♂, from cells of *Auplopus* nest, Plummers Island, Md., 1910, E. A. Schwarz. ♂, from cell of *Auplopus* nest, without data. ♂, from cell of mud nest that appears to be that of *Phanagenia bombycina*, Columbia, Mo.

This species ranges throughout the United States and southern Canada.

2. Messatoporus discoidalis (Cresson)

FIGURE 338,c

Mesostenus ferrum-equinum Walsh and Riley, 1869, Amer. Ent., vol. 1, p. 133. Name preoccupied by Brullé, 1846. Type: Illinois? (lost).

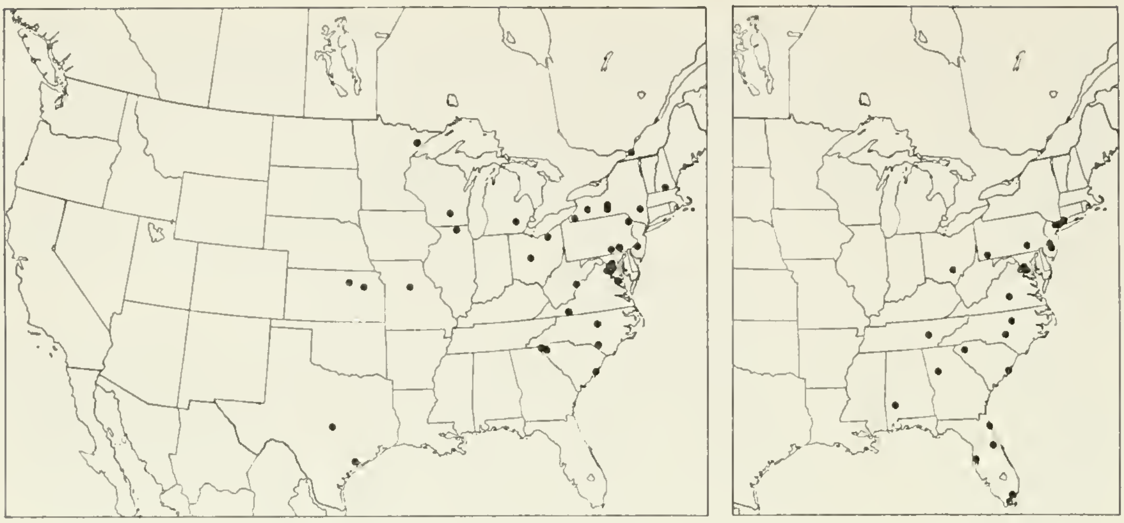
?*Mesostenus discoidalis* Cresson, 1872, Trans. Amer. Ent. Soc., vol. 4, p. 162; ♀. Type: ♀, Bosque Co., Tex. (Washington).

Mesostenus jocosus Provancher, 1874, Naturaliste Canadien, vol. 6, p. 300; ♀. Type: ♀, Quebec (Quebec).

Front wing of male 5.4 to 8.4 mm. long, of female 5.6 to 8.5 mm. long; flagellum, clypeus, mesoscutum, and general structure similar to that of *rufiventris* except that mesopleurum and metapleurum are usually distinctly mat, oblique groove setting off upper hind part of mesopleurum usually has some fine, weak, transverse wrinkles, and that thyridium of second tergite averages a little wider (about 0.5 as wide as long).

Male: Colored like female except that front and middle legs are more whitish, infuscation on upper side of hind coxa averages larger, hind second trochanter is fuscous, and infuscation on hind tibia is stronger and more extensive.

Female: Head, body, and hind coxa marked with black and white as in figure 338,c; palpi white; antenna black, the scape except above and broad band on flagellum white; mesoscutum with a median white spot, from which there usually extends forward on each side a narrow white stripe along outer edge of median lobe of mesoscutum; front



Figures 256, 257.—Localities: 256 (left), *Messatoporus discoidalis;* 257 (right), *M. compressicornis.*

leg whitish, sometimes with a fuscous stripe on upper side of coxa, with a brown stripe on upper side of femur, and last segment of tarsus light brown; middle coxa, trochanters, and femur light fulvous, the coxa with whitish areas; middle tibia and tarsus stramineous, the last segment of tarsus brown; hind trochanters and femur fulvous, the second trochanter brownish fulvous; hind tibia fulvous, its apical 0.3± progressively more strongly infuscate toward apex; hind tarsus white, the basal 0.2 of first segment fuscous.

There is some doubt about the type of *discoidalis*. It may be a specimen of *M. rufiventris* with unusual coloration.

Specimens (34♂, 40♀): From Georgia (Satolah at 2,600 ft.); Illinois (Rockford); Kansas (Lawrence and Riley Co.); Maryland (Plummers Island, Silver Spring, and Takoma Park); Michigan (Ann Arbor); Minnesota (St. Louis Co.); Missouri (Columbia); New Hampshire (Wilton); New Jersey (Moorestown); New York (Bemus Point, Bethany, Greene Co., Ithaca, and Ludlowville); North Carolina (Maxton and Wake Co.); Ohio (Puritas Springs in Cuyahoga Co. and Westerville); Pennsylvania (Carlisle Junction, Lancaster Co., and Paupack); Quebec (Montreal Island); South Carolina (McClellanville and Mountain Rest); Texas (Victoria); Virginia (Arlington, Galax, Vienna, and Westmoreland State Park); West Virginia (Cheat Mt. in Randolph Co. at 2,000 ft.); and Wisconsin (Madison).

This species emerges later than *M. rufiventris.* It is on the wing from early summer to mid-fall. Early and late dates of collection are: May 8 at Lawrence, Kans.; May 17 and 18 at McClellanville, S.C.; June 7 at Takoma Park, Md.; June 17 at Westerville, Ohio; June 24 at Ithaca, N.Y.; September 29 at Ithaca, N.Y.; October 6 at Silver Spring, Md.; and November 8 on Plummers Island, Md.

Reared specimens are as follows: 3♂, from nest of *Auplopus mellipes mellipes*, Vienna, Va., April 26, 1942, J. C. Bridwell. ♀, from nest of *Auplopus mellipes mellipes*, without further data. ♀, reared from mud cells with *Ceropales maculata fraterna* [doubtless cells of *Auplopus* or *Phanagenia*], Rockford, Ill., Dec. 17, 1920, O. H. S. ♂, reared from *Phanagenia bombycina*, Apr. 24, 1884, T. Pergande. ♀, reared from mud nest that appears to belong to *Phanagenia bombycina*, Columbia, Mo. ♀, reared from "mud wasp," Victoria, Tex., Mar. 23, 1909, J. D. Mitchell.

This species occurs in the Carolinian and Austroriparian faunas. It is adult from early summer to mid-fall.

3. Messatoporus compressicornis Cushman

FIGURE 338,d

Messatoporus compressicornis Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 12; ♂, ♀. Type: ♀, Inglenook, Pa. (Washington).

Messatoporus major Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 13; ♀. Type: ♀, Orlando, Fla. (Washington).

Front wing 5.4 to 7.8 mm. long in male, 6.6 to 9.7 mm. long in female; apical half of clypeus quite flat, contrasting in shape with the convex basal half; apical part of flagellum rather strongly compressed, the last 8± segments about twice as deep as wide; mesoscutum sparsely hairy, its hind half almost hairless; mesopleurum and metapleurum polished, not at all wrinkled, with fine, weak punctures that are separated by about 4.0 their diameter; thyridium of second tergite about 0.7 as wide as long.

Head, body, and hind coxa marked with black and white as in figure 338,d; palpi white; antenna black, with a broad white band on flagellum, the lower half of male scape white; mesoscutum with a subcircular median white spot; front and middle coxae of male white, the middle coxa and sometimes the front coxa with a dorsal black stripe; front and middle coxae of female white, with irregular dorsal and ventroposterior black stripes; trochanters white, or in female more or less tinged with fulvous, usually blackish basally, the second hind trochanter of male mostly fuscous, of female mostly fuscoferruginous; front and middle legs beyond trochanters pale fulvous, the last segment of the tarsi fuscous and first through fourth segments of male middle tarsus brownish, the third segment paler; hind femur fulvous, in male its base and apex somewhat infuscate; hind tibia pale fulvous, its apical 0.33 in male and apical 0.1 in female fuscous; hind tarsus white, the basal 0.35± of first segment black.

This may prove to be a subspecies of the Mexican *Messatoporus arcuatus* (Cresson), 1873. It appears to differ only in minor color characters.

Specimens (12♂, 14♀): From Alabama (Thomasville); Connecticut (Stamford); District of Columbia; Florida (Homestead, Paradise Key in Everglades National Park, St. Augustine, and Tarpon Springs); Georgia (Atlanta); Maryland (Plummers Island); New Jersey (Moorestown, Ramsey, and Tabernacle); New York (Mosholu in New York City); North Carolina (Raleigh and Southern Pines); Ohio (Hocking Co.); Pennsylvania (Dunbar); South Carolina (McClellanville and Mountain Lake in Greenville Co.); Tennessee (Grassy Cove in Cumberland Co.); and Virginia (Dunn Loring and Fluvanna Co.).

Dates of collection are from mid-spring to mid-fall. Unusually early and late dates are: April 7 and 12 at Paradise Key, Fla.; April 12 at St. Augustine, Fla.; April 20 at Thomasville, Ala.; May 12 at Raleigh, N.C.; September 11 in Hocking Co., Ohio, and at Dunn Loring, Va.; September 23 at Homestead, Fla.; and October 3 at Southern Pines, N.C.

This species is found in the Austroriparian fauna and occurs sparingly in the Carolinian fauna.

2. Genus Acroricnus

FIGURES 323,b; 329,o

Acroricnus Ratzeburg, 1853, Die Ichneumonen der Forstinsecten . . . vol. 3, p. 92. Type: (*Acroricnus schaumii* Ratzeburg) = *stylator* (Thunberg); monobasic.

Xenodocon Foerster, 1855, Verh. Naturh. Ver. Rheinlande, vol. 12, p. 237. Type: (*Xenodocon ruficornis* Foerster) = *seductor* (Scopoli); monobasic.

Macrobatus Holmgren, 1856, Svenska Vetensk. Akad. Handl., vol. 75, p. 50. Type: (*Cryptus macrobatus* Gravenhorst) = *stylator* (Thunberg); monobasic.

Linoceras Taschenberg, 1865, Zeitschr. Gesam. Naturwiss. Halle, vol. 25, p. 8, 105. Type: (*Cryptus macrobatus* Gravenhorst) = *stylator* (Thunberg); designated by Viereck, 1915.

Leptobatides Buysson, 1896, *In* André, Species des hyménoptères d'Europe and d'Algérie, vol. 6, p. 678, pl. 3. Type: *Leptobatides abeillei* Buysson; monobasic.

Agathobanchus Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 97. Type: (*Banchus aequatus* Say) = *stylator aequatus* (Say); original designation.

Front wing 6.5 to 13.5 mm. long; cheek about 0.8 as long as basal width of mandible; occipital carina complete or its lower end not quite reaching hypostomal carina; apical carina of propodeum present, weak, complete or almost so; propodeum beyond basal carina punctate, not predominantly with transverse wrinkling; last segment of hind tarsus with two or several strong bristles on the under side at the middle; areolet quite large, roughly pentagonal, too narrow and oblique for a regular pentagon; first abdominal segment slender, a little widened apically, its spiracle near the apical 0.38; ovipositor tip depressed, weakly sagittate in dorsal view, the tips of ventral valves enclosing tip of dorsal valve, their teeth in the form of strong vertical ridges.

Acroricnus is a small genus that is widely distributed in the Northern Hemisphere. Only one species occurs in the United States. It was studied in some detail by Mitchell, who has divided it into a number of subspecies. The treatment below is taken from his publication (1950, Ann. Ent. Soc. America, vol. 43, pp. 251–260). Distributional data are cited only from specimens seen by ourselves, but the distributional maps are made to include also the localities published by Mitchell.

1. Acroricnus stylator (Thunberg)

Front wing 6.5 to 11.5 mm. long; prepectal carina complete, extending upward and forward to near front margin of mesopleurum; transverse carinae of propodeum rather distinct; groove between propodeum and metapleurum deep and strongly foveolate; hind spur of hind tibia more than half as long as its basitarsus.

Coloration variable, according to the subspecies. Wings subhyaline or in the subspecies *edwardsii* with a yellow tinge.

This is a Holarctic species, with a number of subspecies. Adults occur through summer and early fall. The usual habitat is rather open, partly forested country and overgrown fields. Specimens are frequently seen on windows of buildings, presumably because many of their hosts nest around buildings and the species characteristically explores such situations. They are also rather common on umbelliferous flowers. It has been reared repeatedly from the mud nests of *Ancistrocerus*, *Eumenes*, and *Sceliphron*. In the case of the rearings from *Sceliphron* nests, it is not certain whether the host was *Sceliphron* itself or a eumenine vespid that made its nests in abandoned nests of *Sceliphron*.

The Nearctic subspecies are keyed and described below:

1. Abdomen prominently marked with yellow; range: central California to southern Oregon . . . . **1h. stylator edwardsii** (Cresson)
   Abdomen not prominently marked with yellow 2
2. Hind tibia entirely yellow 3
   Hind tibia yellow with its apical 0.3± fuscous 5
3. Propodeum, metapleurum, and hind coxa entirely black; scutellum black or yellow; range: Canadian zone and adjacent part of Transition zone east of Rocky Mountains . . . . **1f. stylator aequatus** (Say)
   Propodeum, metapleurum, and hind coxa, or at least one of them, marked with yellow; scutellum entirely yellow 4
4. Hind femur broadly fulvous basally; range: New Mexico and Arizona. **1d. stylator townesi** Mitchell
   Hind femur entirely black or only its extreme base fulvous; range: Alleghanian and Carolinian faunas . . . . **1e. stylator junceus** (Cresson)

5. Propodeum, metapleurum, and hind coxa black; scutellum black or yellow 6
   Propodeum, metapleurum, and hind coxa, or at least one of them, marked with yellow; scutellum entirely yellow 7
6. Hind femur entirely fulvous; range: Eurasia and parts of northwestern North America . . . . **1a. stylator stylator** (Thunberg)
   Hind femur black with its base broadly fulvous; range: Colorado to Alaska, in the Rocky Mountains . . . . **1b. stylator niger** Mitchell
7. Hind femur broadly fulvous basally; range: Colorado and Wyoming. **1c. stylator excelsus** (Cresson)
   Hind femur entirely black or only its extreme base fulvous; range: South Dakota . . . . **1g. stylator axilaris** Mitchell

1a. Acroricnus stylator stylator (Thunberg)

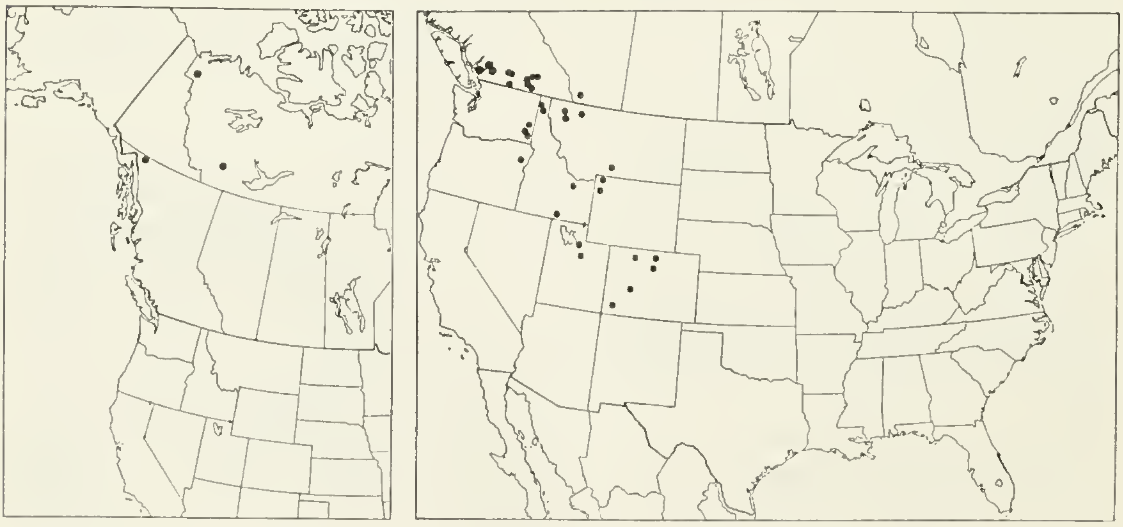
Ichneumon stylator Thunberg, 1822, Mém. Acad. Sci. St. Pétersbourg, vol. 8, p. 265 [key]; 1824, vol. 9, p. 320 [description]; [♂]. Type: ♂, Sweden (Uppsala).

Male: Colored like female except that face, clypeus, palpi, and under side of scape are yellow.

Female: Black. Flagellum fulvous, dusky above and with a yellowish band; mark on front orbit (usually), femora, and front tibia and tarsus fulvous, the tarsus dusky apically; hind tibia yellowish fulvous, its apical 0.3± infuscate; hind tarsus yellow, its first segment partly or mostly fulvous, its last segment brown.

Specimens: ♀, Atlin, 2,200 ft., B.C., June 27, 1955, B. A. Gibbard (Ottawa). ♀, Fort McPherson, N.W.T., July 9, 1957, S. D. Hicks (Ottawa). ♂, Fort Simpson, N.W.T., July 15, 1950, D. P. Whillens (Ottawa). Also a number of males and females from Europe.

This subspecies occurs in Eurasia and in the northwestern corner of North America. Mitchell (1950, Ann. Ent. Soc. America, vol. 43, p. 253) records intergrades between it and the more southern *A. stylator niger* from Eklutna Lake, Alaska and from Atlin, B.C.



Figures 258, 259.—Localities: 258 (left), *Acroricnus stylator stylator;* 259 (right), *A. s. niger.*

1b. Acroricnus stylator niger Mitchell

Acroricnus stylator niger Mitchell, 1950, Ann. Ent. Soc. America, vol. 43, p. 253; ♂, ♀. Type: ♀, Robson, B.C. (Ottawa).

Male: Colored like female except that face, clypeus, labrum, median part of mandible, part or all of front coxae, front of middle coxa, and trochanters, are yellow, the upper part of hind trochanter infuscate.

Female: Black. Flagellum fulvous, fuscous above, with a whitish band; scape beneath, front orbit, sometimes parts of face and clypeus, usually the labrum, line on hind orbit, tegula, often subtegular ridge, sometimes part and rarely all of scutellum, part or all of front trochanters, second segment of middle and hind trochanters, front and middle femora and tibiae, hind tibia except apical 0.3±, and tarsi, yellow or pale fulvous; hind femur black, its basal 0.4± fulvous.

Specimens (27♂, 15♀): From British Columbia (Brilliant, Carbonate on Columbia River at 2,600 ft., Robson, Seton Lake near Lillooet, Trinity Valley, and Vernon); Colorado (Aspen, Ouray at 8,500 ft., and West Estes Park at 7,800 ft.); Idaho (5 miles northeast of Leadore, Oakley at 4,542 ft., Priest Lake at Four Mile Camp, Sandpoint, and "Snake River at Divide Creek"); Montana (near Kalispell, junction of Rock Creek and Madison River in Gallatin National Forest, and Two-Medicine Lake in Glacier Park); Oregon (Queen Mine above Cornucopia at 5,000 ft.); and Wyoming (Grand Teton National Park and Mammoth Hot Springs in Yellowstone Park).

Dates of capture are from late in May to fall, the earlier and later ones being: May 21, 22, 25, and 27 and June 1 at Robson, B.C.; May 30 at Lillooet, B.C.; August 30 at Merritt, B.C.; and September 6 and October 31 at Robson, B.C. These include dates of capture recorded by Mitchell in the original description.

This subspecies ranges from southern British Columbia to Colorado, in the Rocky Mountains.

1c. Acroricnus stylator excelsus (Cresson)

Cryptus excelsus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 293; ♂, ♀. Lectotype: ♀, Colorado (Philadelphia).

Male: Colored like female except that face, clypeus, and mandible are entirely yellow and that yellow areas on front and middle coxae are more extensive.

Female: Black. Flagellum fulvous, fuscous above, with a median yellowish band; scape beneath, more or less of face and clypeus, labrum, palpi, front orbit, short line on hind orbit, usually a small spot on collar of pronotum, tegula, usually the subtegular ridge, area or line on propodeum, often a spot on mesopleurum, part of front and middle coxae, sometimes spot on hind coxa, front and middle legs beyond coxae, hind tarsus, and basal 0.65± of hind tibia, yellow; second hind trochanter, basal 0.3 to 0.5 of hind femur, and sometimes sides of first tergite, fulvous.

Specimens: ♂, Boulder, Colo., Apr. 30, 1934, W. D. McDonough (Townes). ♂, Boulder, Colo., June 3, 1926, M. C. Van Duzee (San Francisco). ♂, Boulder, Colo., June 20, 1934, M. T. James (Townes). ♀, Florissant, Colo., July 2, 1907, S. A. Rohwer (Cambridge). ♀, Colorado-Wyoming state line, Aug. 9, 1950, R. R. Dreisbach and R. K. Schwab (Dreisbach). 6♂, near Estes Park, Colo., June 14 and 15, 1948, H., M., G., and D. Townes (Townes). ♂, Golden, Colo., June 17, 1940, A. L. Melander (Cambridge). ♂, Colorado (New York). ♂, 3♀, 12 miles southwest of Rapid City, S. Dak., Aug. 25, 1948, Evans and Ball (Ottawa). The specimens from Rapid City, S. Dak., are somewhat intermediate to the subspecies *axilaris*.

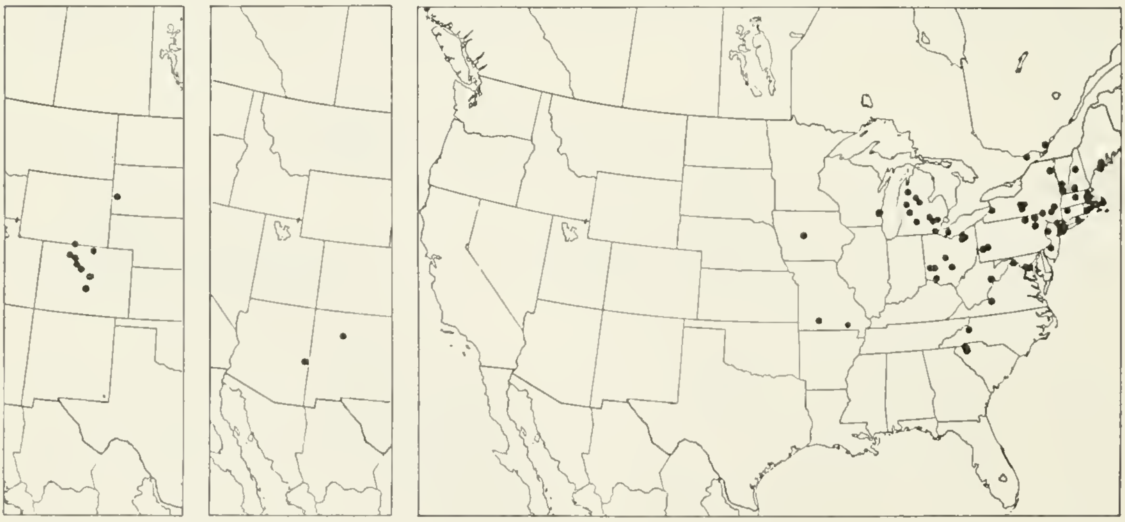
This subspecies occurs in the mountains of central Colorado and just across the border into Wyoming. Atypical specimens have been taken in the Black Hills of South Dakota. Mitchell (1950, Ann. Ent. Soc. America, vol. 43, p. 256) records a questioned specimen from Vancouver, B.C.

1d. Acroricnus stylator townesi Mitchell

Acroricnus stylator townesi Mitchell, 1950, Ann. Ent. Soc. America, vol. 43, p. 256; ♂, ♀. Type: ♀, near Alpine, Ariz. (Townes).

Colored approximately like the subspecies *junceus*, except that basal 0.35± of hind femur is fulvous.

Specimens: 32♂, 1♀ (type and paratypes), near Alpine, Ariz., May 24 to 30, 1947, H. and M. Townes (Townes and Ithaca). 2♂, Jemez Springs, N. Mex., July 1, 1941, R. H. Beamer (Lawrence).



Figures 260–262.—Localities: 260 (left), *Acroricnus stylator excelsus;* 261 (center), *A. s. townesi;* 262 (right), *A. s. junceus.*

1e. Acroricnus stylator junceus (Cresson)

Cryptus junceus Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 295; ♀.
Type: ♀, Illinois (Philadelphia).
Biology: Walsh and Riley, 1869, Amer. Ent., vol. 1, p. 137.

Male: Colored like female except that face, usually the cheek mandible, and almost all of front and middle coxae are yellow.

Female: Black. Flagellum yellowish, fuscous above, with a median yellowish band; scape beneath, face, clypeus, labrum, front orbit, line on hind orbit, spot on pronotal collar, usually spot on upper edge of pronotum, tegula, usually subtegular ridge, scutellum, postscutellum, area on propodeum (varying from narrow line to about 0.4 of propodeum), usually spot on metapleurum, often area behind hind wing, at least front face of front coxa, usually part of middle coxa, usually spot on hind coxa, front and middle legs beyond coxae, and hind tibia and tarsus, yellow.

Specimens (54♂, 83♀): From Connecticut (Colebrook); Iowa (Ames); Maine (Lincoln Co. and Orrs Island); Maryland (Bowie and Takoma Park); Massachusetts (Barnstable, Forest Hills, Holliston, Newton Center, Petersham, Taunton, Wollaston, and Woods Hole); Michigan (Ann Arbor, Calhoun Co., Clare Co., George Reserve in Livingston Co., Kent Co., Midland Co., Monroe Co., Newaygo Co., Wayne Co., and Wexford Co.); Missouri (Van Buren and Willard); New Hampshire (Franconia and Mount Monadnock); New Jersey (Delaware Water Gap and Moorestown); New York (Hancock, McLean, McLean Reservation in Tompkins Co., Catskill Mts., Derby, Essex Co., Farmingdale, Greene Co., Ithaca, L[ittle] Neck on Long Island, Long Beach on Long Island, New Rochelle, Orient, Vista, and West Farms in New York City); North Carolina (Blowing Rock); Ohio (Bedford, Cincinnati, Cleveland, Columbus, Delaware Co., Fairfield, Montgomery Co., Puritas Springs in Cuyahoga Co., and Put-in-Bay on South Bass Island); Ontario (Merivale); Pennsylvania (Buena Vista, Mud Pond south of Gibson, Pittsburgh, Spring Brook, and Wilawana); Quebec (St. Esprit); Rhode Island (Alton); South Carolina (Greenville, and Venus in Greenville Co.); Vermont (Bennington and West Rupert); Virginia (Brushy Mts. in Rockbridge Co.); West Virginia (Bolivar, and Cheat Mt. in Randolph Co.); and Wisconsin (Milwaukee). There is also a female in Cambridge (presumably mislabeled) stated to be from "Mts. of Colo., Aug. Sept., Carpenter."

Unusually early and late collection dates on the above specimens are: May 22 at Little Neck, Long Island, N.Y.; May 29 in Monroe Co., Mich.; May 30 at Bowie, Md.; September 25 at McLean, N.Y.; September 27 at Long Beach, Long Island, N.Y.; October 3 at Takoma Park, Md.; October 10 at Willard, Mo.; and October 22 at Barnstable, Mass.

Reared specimens comprise: ♂, reared from "*Odynerus*," O. Sacken (New York). ♀, reared from *Eumenes* nest, Y. P. Calvert (Ithaca). We have seen a few other specimens reared from *Eumenes* nest but do not have a record of them at hand. Mitchell (1950, Ann. Ent. Soc. America, vol. 43, p. 258) records also *Ancistrocerus birenimaculatus*, *A. tigris*, and *Sceliphron caementarium* as hosts.

This subspecies occurs in the Alleghanian and Carolinian faunas.

1f. Acroricnus stylator aequatus (Say)

Banchus aequatus Say, 1836, Boston Journ. Nat. Hist., vol. 1, p. 247 (Leconte ed. vol. 2, p. 701); [♂]. Type: ♂, Indiana (destroyed).

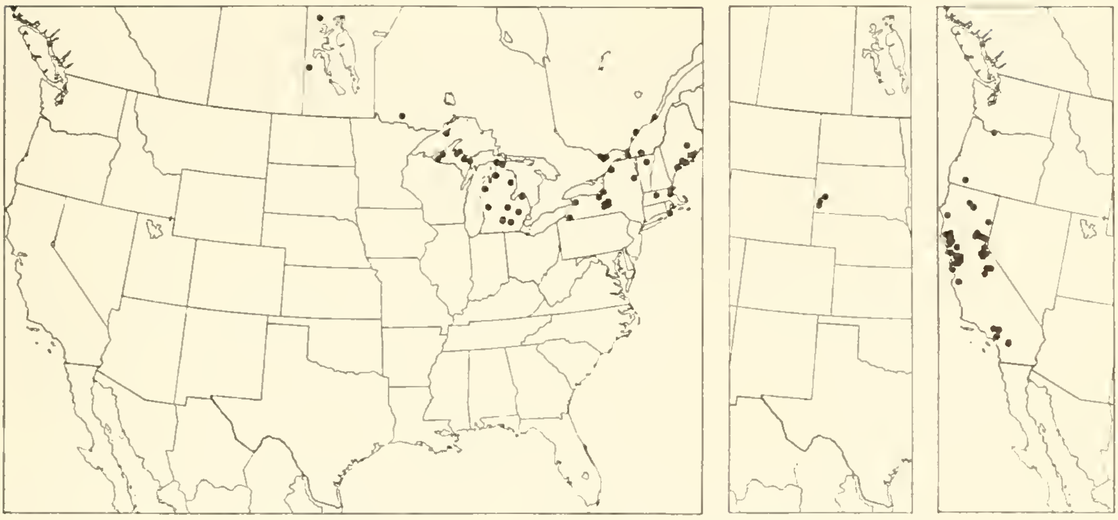
Atractodes Cloutieri Provancher, 1874, Naturaliste Canadien, vol. 6, p. 150; ♂, ♀. Lectotype: ♀, Quebec (Quebec).

Male: Colored like female except that face, clypeus, labrum, usually the cheek, mandible, larger area on front coxa, and part of middle coxa are yellow.

Female: Black. Flagellum yellow, fuscous above, with a median yellowish band; scape beneath, usually clypeus and labrum, rarely the face, palpi, front orbit, line on hind orbit, rarely spot on pronotal collar, sometimes part and rarely all of scutellum and postscutellum, part or all of tegula, sometimes part of front coxa, part of trochanters of front and middle legs, front and middle femora, and all tibiae and tarsi, yellow.

Specimens (41♂, 32♀): From Labrador (Goose Bay); Maine (Brooksville, "Carrs," Casco Bay, Glenmere in Knox Co., Lincoln Co., and Orono); Manitoba (Atikameg Lake and Birch River); Massachusetts (Lexington, Newton Centre, and Petersham); Michigan (Alcona Co., Alger Co., Ann Arbor, Baraga Co., Charlevoix Co., East Lansing, Genesee Co., Gogebic Co., Huron Mts., Isle Royale, Mackinac Island, Manistee Co., Marquette Co., Mecosta Co., Midland Co., Ontonagon Co., Port Austin, and Saint Ignace); New Brunswick (Fundy National Park); New York (McLean Reservation in Tompkins Co., Bemus Point, Boreas River in Essex Co., Fishers Island, Ithaca, Joy, Morristown, Oswego, Six Mile Creek in Ithaca, Taughannock Falls, and Tonawanda Indian Reservation in Genesee Co.); Nova Scotia (Truro); Ontario (Bells Corners, Gold Rock in Rainy River District, Ottawa, Rockcliffe in Ottawa, and "Salines"); Prince Edward Island (Dalvay House in Canadian National Park); Quebec (Ile d'Orleans, Laval Co., Missiquoi Co., and St. Hilaire); and Vermont (Lake Willoughby at 1,400 ft.).

Early and late dates of capture are May 29 at Ann Arbor, Mich. and at Ottawa, Ont.; September 4 at Midland, Mich.; September 5 at Oswego, N.Y.; and September 16 at Ithaca, N.Y. There are no reared specimens among our material but Mitchell (1950, Ann. Ent. Soc. America, vol. 43, p. 259) records a rearing from *Eumenes fraterna*.



FIGURES 263–265.—Localities: 263 (left), *Acroricnus stylator aequatus;* 264 (center), *A. s. axilaris;* 265 (right), *A. s. edwardsii.*

1g. Acroricnus stylator axilaris Mitchell

Acroricnus stylator axilaris Mitchell, 1950, Ann. Ent. Soc. America, vol. 43, p. 259; ♀. Type: ♀, Harney Peak, S. Dak. (Washington).

Male: Unknown.

Female: Colored like female of subspecies *excelsus* except that hind femur is almost entirely black (only a narrow basal ring fulvous) and yellow marking on thorax averages less extensive.

Specimens: ♀, Custer, S. Dak. (East Lansing). 8♀, 12 miles southwest of Rapid City, S. Dak., Aug. 25, 1948, Evans and Ball (Ottawa). The eight specimens from near Rapid City are part of a series of 1♂, 11♀ which, as a series, is intermediate to the subspecies *excelsus*. Eight females of the series are classified (rather arbitrarily) as the subspecies *axilaris* and the rest as *excelsus*.

1h. Acroricnus stylator edwardsii (Cresson)

Linoceras Edwardsii Cresson, 1878, Proc. Acad. Nat. Sci. Philadelphia, vol. 30, p. 365; ♂. Type: ♂, California (Philadelphia).

Male: Colored like the female except as follows: propodeum, metapleurum, area behind hind wing, and hind coxa often without yellow markings; hind femur black with its basal 0.3± fulvous; hind tibia usually infuscate apically; abdominal tergites usually less extensively marked with yellow, the fifth and following tergites often entirely black.

Female: Black. Flagellum yellowish to fulvous below, fuscous above, with a yellowish band; scape beneath, front and hind orbits, face, clypeus, labrum, mandible, pronotal collar, areas of variable extent on pronotum and mesoscutum, tegula, subtegular ridge, rarely patches on mesopleurum, scutellum, postscutellum, area behind hind wing, spot on metapleurum, area on propodeum (usually large), often spot on hind coxa, usually most of front and middle coxae, legs beyond coxae except usually for subapical 0.4± of hind femur, and most of abdomen, yellow. The second to fourth tergites are black at base and sometimes the fifth tergite is narrowly black at base. Wings with a yellow tinge and faint infuscation.

Specimens (46♂, 32♀): From California (Albany, Alum Rock Park in Santa Clara Co., Arroyo Seco in Monterey Co., Bass Lake in Madera Co., Berkeley, Briceburg at 1,500 ft., Cache Creek in Lake Co., Casa Loma, 5 miles north of Cassel, Chile Bar in El Dorado Co., Danville, Dardanelle, Dodge Ridge in Tuolumne Co., Downieville at 3,900 ft., Duncans Mills, Dublin in Alameda Co., Fort Seward, Graeagle, Hat Creek, Idylwild in San Jacinto Mts., 1 mile south of Lafayette, Lakeport, Leland Meadow in Tuolumne Co., Lucerne, Mill Valley, Mint Canyon in Napa Co., Oakhurst, Oakland, Palo Alto, 10 miles east of Rutherford, San Antonio Canyon, "Sancelito," Santa Cruz, Sardine Lakes in Sierra Co., Sobre Vista in Sonoma Co., Strawberry in Tuolumne Co., Summit Camp in Lassen Co., Tanbark Flat in Los Angeles Co., and Volcano Lake in Sierra Co.); and Oregon (Ashland and Hood River). There is also a male specimen collected by A. Agassiz on the "Gulf of Georgia," Lake Superior (Cambridge), that has about as much yellow as would be expected in a male of this subspecies. It seems to be an abnormally colored individual for its locality, but may be another example of the tendency for this part of Canada to have western forms.

Most of the specimens were collected from May 1 to the end of July. Collection dates outside of this range are: March 25 and April 15 and 30 at Berkeley, Calif.; April 23 and 29 at Albany, Calif.; April 26 at Palo Alto, Calif.; "April" at Lucerne, Calif.: August 3 at Lucerne, Calif.; August 30 at Volcano Lake, Sierra Co., Calif.; and "September" at Mill Valley, Calif. Reared specimens comprise 2♂, 1♀, from old nests of *Sceliphron*, Lucerne, Calif., 1951 and 1952, H. B. Leech. ♂, from nest of *Sceliphron caementarium*, Ashland, Oreg., December 1938, H. W. Prescott. ♀, taken dead from mud nests, Duncans Mills, Calif., July 1908.

This subspecies occurs in California and Oregon.

4. SUBTRIBE ECHTHRINA

Clypeus usually rather large, usually weakly convex, often with a preapical transverse ridge, its apex usually more or less truncate and often with a median apical tooth or pair of teeth; mandible about 1.8 to 3.0 as long as it is wide at middle, its lower tooth at least as long as upper tooth, frequently a little longer; flagellum moderately slender, in female its apex abrupt because of an apical sensory disc or a truncate, short apical peg or flange; thorax usually long; propodeum usually long, its basal transverse carina usually strong, its apical transverse carina present or absent, when present usually without sublateral crests and never forming sublateral teeth; propodeal spiracle round to elongate; front tibia of female inflated, its base narrow; fourth tarsal segments of female with a compact group of apical bristles on underside that are not or only weakly divided on the midline, the segment not distinctly bilobed apically (see from under side); areolet varying from unusually large to very small, pentagonal, square, or rectangular, when small often open apically; first tergite more or less widened apically, the widening rather gradual; spiracle of first tergite at, a little in front of, or definitely behind the middle; abdominal tergites 7 and 8 of female usually enlarged; female subgenital plate not unusually large and sclerotized; ovipositor moderately short to long, always projecting conspicuously beyond apex of abdomen, more or less compressed, the tip of lower valves with a dorsal lobe that encloses or partly encloses the tip of upper valve (except in *Helcostizus* and in some species of *Echthrus*); apical teeth on lower valve of ovipositor tending to form close vertical ridges; upper valve without apical teeth, but its dorsal edge often rippled.

This is a moderate-sized group that is parasitic on wood borers. Most of the species are tropical, but there are five genera in our area.

Key to the Nearctic genera of Echthrina

1. Spiracle of first abdominal tergite near its apical 0.43; first tergite with median dorsal carinae distinct, at least near the spiracle; clypeus with a strong median point . . . . **1. Xylophrurus** (p. 478)
   Spiracle of first abdominal tergite at or a little in front of its middle; first tergite without median dorsal carinae except in *Helcostizus annulicornis* . 2
2. Basal transverse carina of propodeum absent or obsolescent, the apical transverse carina strong; clypeus with a median apical tooth in the Nearctic species; areolet large; second tergite not distinctly punctate. **2. Echthrus** (p. 486)
   Basal transverse carina of propodeum strong, the apical transverse carina often absent; clypeus without a median apical tooth 3
3. Nervulus distad of basal vein by about 0.3 its length (fig. 326,a); basal transverse carina of propodeum angled strongly forward at the middle (fig. 326,a); areolet small; nervellus broken near its lower 0.35 . . **5. Helcostizus** (p. 513)
   Nervulus basad of basal vein by about 0.3 its length; basal transverse carina of propodeum rather evenly curved, not strongly angled forward at the middle 4
4. Areolet small (fig. 325,a); nervellus broken above the middle; sternaulus present, though usually weak . . . . **3. Agonocryptus** (p. 502)
   Areolet large (fig. 325,b); nervellus broken below the middle; sternaulus absent . . . . **4. Cryptohelcostizus** (p. 504)

1. Genus Xylophrurus

FIGURE 324,a

Xylophrurus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 169. Type: (*Echthrus lancifer* Gravenhorst) = *dispar* (Thunberg); included by Schmiedeknecht, 1888.

Nyxeophilus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 187. Type: (*Nyxeophilus bimaculatus* Thomson) = *angustus* (Dalman); designated by Viereck, 1914.

Macrocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 486. Type: (*Echthrus lancifer* Gravenhorst) = *dispar* (Thunberg); monobasic.

Xylophruridea Viereck, 1912, Proc. U.S. Nat. Mus., vol. 42, p. 646. Type: *Xylophruridea agrili* Viereck; original designation.

Front wing 5.0 to 10.0 mm. long; clypeus moderately small, with a strong median apical tooth; sternaulus rather weak; pleural carina present; transverse carinae of propodeum both sharp, complete or the apical one interrupted medially, the apical carina forming very weak sublateral crests; areolet moderately large, pentagonal but its front side narrow; nervulus basad of basal vein by about 0.3 its length; nervellus broken near its lower end; first tergite without a subbasal lateral tooth, its spiracle near its apical 0.43, its median dorsal carinae distinct, at least near spiracle; ovipositor sheath 0.3 to 0.65 as long as front wing; ridges on ovipositor tip close together.

Xylophrurus is a small genus, of Holarctic distribution. Specimens are scarce in collections, and this, together with the fact that the species have a rather uniform structure and color, has made it difficult to work out the Nearctic forms. When more specimens are available, modifications of the classification proposed below will likely be in order.

Adults occur mostly in spring and some in the fall; almost none in the summer. They are usually collected around shrubby growth. The species parasitize coleopterous borers in small branches of deciduous trees and shrubs, and a European species parasitizes Aculeata nesting in twigs.

Key to the Nearctic species of Xylophrurus

1. Middle and hind coxae fulvous; abdomen entirely or mostly fulvous . . . 2
   Middle and hind coxae black 3
2. Head about 0.88 as wide across temples as across eyes; wings faintly to strongly infused with brown, not distinctly banded . . . . **1. sitkensis** (Ashmead)
   Head about 1.01 as wide across temples as across eyes; wings subhyaline, the front wing of female usually with a weak brown band at level of stigma and its apex weakly darkened . . . . **2. fasciatus** (Ashmead)
3. Punctures on second tergite rather small, separated by about their diameter. **3. bicolor** (Cushman)
   Punctures on second tergite moderately large, separated by about half their diameter 4

4. Apical carina of propodeum complete or incomplete, if incomplete with not more than its median 0.3 lacking; ovipositor sheath about 0.63 as long as front wing; female flagellum with a white band.
4. nubilipennis (Cresson)

Apical carina of propodeum incomplete, its median 0.5± lacking; ovipositor sheath about 0.33 as long as front wing; female flagellum usually without a white band . . . . **5. agrili** (Viereck)

1. Xylophrurus sitkensis (Ashmead)

Cryptoideus purpuripennis Ashmead, 1900, Proc. U.S. Nat. Mus., vol. 23, p. 42; ♀. Misdetermination of *Cryptus purpuripennis* Cresson.

Cryptoideus sitkensis Ashmead, 1902, Proc. Washington Acad. Sci., vol. 4, p. 193; ♀. Type: ♀, Sitka, Alaska (Washington).

Cryptoideus purpuripennis Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 539; ♀. Misdetermination of *Cryptus purpuripennis* Cresson.

Xylophrurus atroruber Townes, 1944, Mem. Amer. Ent. Soc., vol. 11, p. 290. New name for *Cryptoideus purpuripennis* of Ashmead and Cushman. New synonymy. Type: ♀, Santa Cruz Mts., Calif. (Washington).

Front wing 6.2 to 10.0 mm. long; head about 0.88 as wide across temples as across eyes; temple with coarse, close punctures that are somewhat confluent in rows; fourth segment of female flagellum about 2.4 as long as wide; apical carina of propodeum complete; second tergite moderately mat, with moderate-sized punctures that are separated by about 0.5 their diameter; ovipositor sheath about 0.50 as long as front wing; teeth on apex of ovipositor moderately close.

Brownish fulvous. Head more or less black but at least the clypeus and orbits fulvous; antenna black, the front of first segment of male antenna fulvous, the front of first three segments of female antenna fulvous; palpi fuscous; thoracic sutures very narrowly to broadly black, or sometimes the thorax mostly black and with only small fulvous areas; wings weakly to strongly suffused with brown, sometimes faintly banded; abdomen of male with more or less of basal

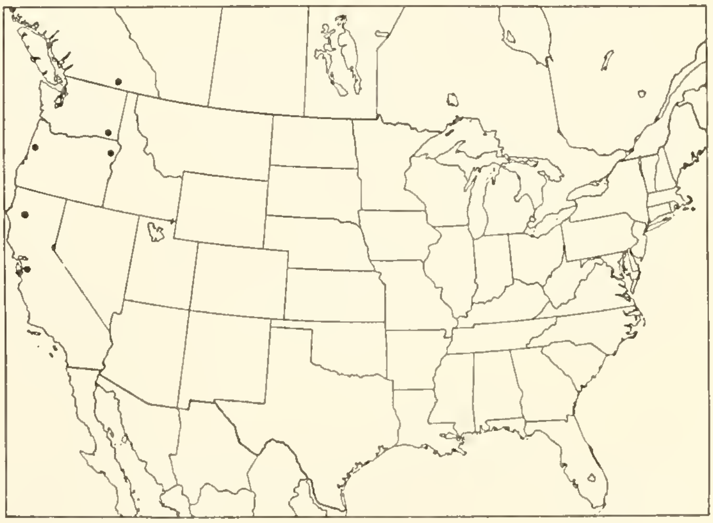


Figure 266.—Localities for *Xylophrurus sitkensis.*

part of first segment infuscate, the seventh and following segments fulvous to fuscous.

Specimens: 7♂, 3♀, Robson, B.C., May 5 to July 23, 1939, 1947, and 1948, H. R. Foxlee (Townes and Ottawa). ♀, Carrville, Trinity Co., 2,400 to 2,500 ft., Calif., May 18, 1934, E. C. Van Dyke (San Francisco). ♂, Carrville, Trinity Co., 2,400 to 2,500 ft., Calif., May 27, 1934 (Townes). ♂, Mount Hamilton, Calif., Apr. 14, 1936 (Townes). ♂, Santa Cruz Mts., Calif. (Washington). ♂, Corvallis, Oreg., May 10, 1928, H. A. Scullen (Corvallis). ♀, Lake Wallowa, Oreg., June 15, 1938, E. C. Van Dyke (Townes). ♂, Coppei Creek, Wash., May 27, 1925, R. W. Haegels (Moscow).

This species ranges from southern Alaska to central California.

2. Xylophrurus fasciatus (Ashmead)

Front wing 5.0 to 7.2 mm. long; head about 1.01 as wide across temples as across eyes; temple with coarse, close punctures that are somewhat confluent in rows; fourth segment of female flagellum about 3.8 as long as wide; apical carina of propodeum usually complete, its median 0.3 weak or sometimes absent; second tergite weakly mat, with moderate-sized punctures that are separated by about 0.3 their diameter; ovipositor sheath about 0.50 as long as front wing; teeth on apex of ovipositor exceptionally close together.

Fulvous. Head with black markings that vary from restricted to extensive, at least the face, clypeus, and orbits remaining fulvous; palpi dark brown; male antenna black, the scape and pedicel fulvous except above; scape and pedicel of female fulvous, blackish above; flagellum of female with its basal 5.4 segments fulvous varied with brown, the next 3.6 segments white or fulvous (according to the subspecies), the rest of the segments infuscate; front and middle coxae often varied with fuscous, especially the front coxa; wings faintly tinged with brown, the front wing of female with a broad weak brown band just basad of areolet and its apex a little darkened. The front wing of male often has the same markings as female, but very faint.

There are eastern and western subspecies, distinguished on the color of the flagellum of female:

1. Flagellum of female with a white band covering about 3.6 segments; range: east of Rocky Mountains . . . . **2a. fasciatus fasciatus** (Ashmead)
Flagellum of female without a white band; range: Rocky Mountains and westward . . . . **2b. fasciatus hesperus,** new subspecies

2a. Xylophrurus fasciatus fasciatus (Ashmead)

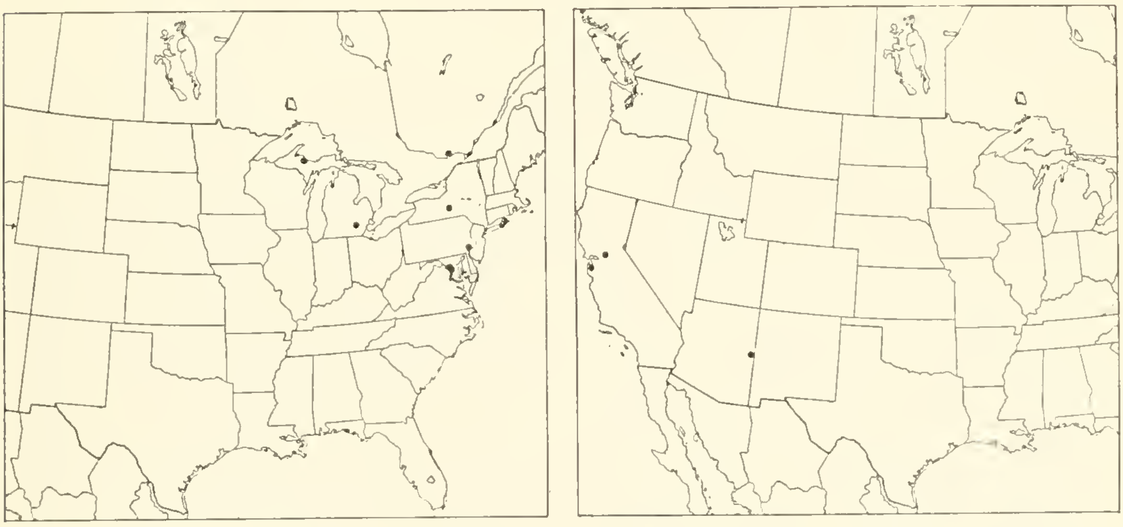
Brachycentrus fasciatus Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 413; ♀. Type: ♀, Texas (Washington).

Cryptoideus rufus Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 538; ♀ Type: ♀, Montgomery Co., Pa. (Washington).

Flagellum of female with a white band extending from basal 0.4 of its sixth segment to apex of ninth.

Specimens: ♂, Plummers Island, Md., Apr. 12, 1914, R. C. Shannon (Washington). ♂, Takoma Park, Md., Apr. 15, 1942, H. and M. Townes (Townes). ♀, Ann Arbor, Mich., May 21, 1959, H. and M. Townes (Townes). ♀, Marquette Co., Mich., June 20, 1955, R. R. Dreisbach (Dreisbach). ♀, Orient, N.Y., Sept. 1, 1949, Roy Latham (Washington). ♀, Riverhead, N.Y., June 10, 1951, Roy Latham (Washington). ♂, Taughannock near Ithaca, N.Y., May 15, 1915 (Ithaca). ♀, Willow Grove, Pa., May 7, 1931, G. B. Sleesman (Washington). ♀, Harrington Lake, Gatineau Park, Que., June 7, 1954, R. McCondochie (Ottawa). 2♂, 1♀, no data (Washington).

This subspecies occurs in the Alleghanian and Carolinian faunas.



Figures 267, 268.—Localities: 267 (left), *Xylophrurus fasciatus fasciatus;* 268 (right), *X. f. hesperus.*

2b. Xylophrurus fasciatus hesperus, new subspecies

Flagellum of female without a white band, its basal two-thirds rather uniformly fulvous, the apical third infuscate.

Type: ♀, reared from *Agrilus angelicus* in *Quercus agrifolia,* Palo Alto, Calif., May 23, 1916, H. E. Burke (Washington, USNM 63830).

Paratypes: ♂, near Alpine, Ariz., May 29, 1947, H. and M. Townes (Townes). 2♂, Davis, Calif., 1936 (Townes). ♂, same data as type (Washington). ♂, Colorado, C. F. Baker (Washington).

This subspecies has been taken in Colorado, Arizona, and California.

3. Xylophrurus bicolor (Cushman)

Front wing 6.0 to 8.0 mm. long; head about 1.04 as wide across temples as across eyes; temple with moderately coarse punctures and oblique irregular wrinkles; fourth segment of female flagellum about

3.3 as long as wide; apical carina of propodeum with its median third usually absent but sometimes present and weak; second tergite mat, with rather small punctures that are separated by about their diameter; ovipositor sheath about 0.5 as long as front wing; teeth on apex of ovipositor spaced as normal for the genus, not unusually close.

There are eastern and western subspecies, distinguished on color as described below:

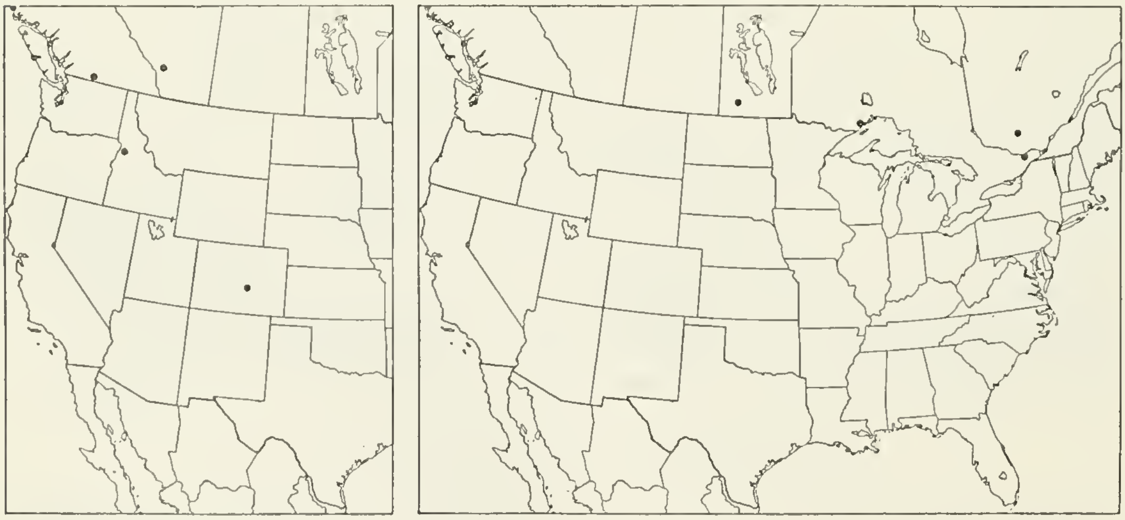
1. Abdomen and hind femur ferruginous or mostly so; range: Rocky Mountains. **3a. bicolor bicolor** (Cushman)
   Abdomen and hind femur entirely black; range: Quebec to Manitoba. **3b. bicolor maurus,** new subspecies

3a. Xylophrurus bicolor bicolor (Cushman)

Cryptoideus bicolor Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 537; ♀. Type: ♀, Colorado (Washington).

Black. Narrow hind and frontal orbits, most of clypeus, a stain on mandible, legs beyond trochanters, and abdomen ferruginous, the legs often infuscate apically, the front legs beyond trochanters sometimes largely infuscate, the middle legs beyond trochanters sometimes partly infuscate; base of first abdominal segment more or less infuscate and apical tergites often more or less infuscate; flagellum of female with a white band occupying about 3 segments (but brownish beneath), sometimes with its basal segments more or less fulvous; wings varying from uniformly infused with brown to pale brownish or subhyaline with a broad brownish band just before areolet and apex brownish; ovipositor sheath black, its apex usually fulvous.

Specimens: ♂, 2♀, Calgary, Alta., May 24, 1923, G. Salt (Washington and Townes). ♀, Oliver, B.C., May 23, 1923, C. B. Garrett



Figures 269, 270.—Localities: 269 (left), *Xylophrurus bicolor bicolor;* 270 (right), *X. b. maurus.*

(Ottawa). ♂, reared from *Salix*, Colorado Springs, Colo., May 18, 1915, A. B. Champlain (Washington). ♂, ♀, reared from *Saperda moesta* in *Populus trichocarpa*, Riggins, Idaho, Mar. 18 and 20, 1914, Swartz (Washington).

This subspecies occurs in the Rocky Mountains.

3b. Xylophrurus bicolor maurus, new subspecies

Black. Hind orbit narrowly fulvous; flagellum of female with a white band that occupies about 4 segments; wings faintly infuscate, the front wing of female with a broad fuscous band just before areolet and its apex weakly infuscate; apex of ovipositor sheath fulvous.

Type: ♀, Wright, Que., May 26, 1933, G. S. Walley (Ottawa).

Paratypes: ♂, Aweme, Man., May 21, 1925, N. Criddle (Ottawa). ♂, Bells Corners, Ont., Apr. 30, 1941, G. S. Walley (Ottawa). ♀, Thunder Bay Beach, Ont., June 11, 1939, H. S. Parish (Townes).

The range is from Quebec to Manitoba, in the Canadian zone.

4. Xylophrurus nubilipennis (Cresson)

Front wing 5.0 to 9.5 mm. long; head usually about 0.98 as wide across temples as across eyes; temple with coarse, strong, very close punctures, in some areas weakly confluent in rows and with weak wrinkles between; fourth segment of female flagellum about 3.8 as long as wide; apical carina of propodeum usually present, its median 0.3± often weak or sometimes absent; second tergite mat, with moderate-sized punctures that are separated by about 0.5 their diameter; ovipositor sheath about 0.63 as long as front wing; teeth on apex of ovipositor spaced a little more widely than in other Nearctic species.

There are three subspecies, distinguished on color as treated below:

1. Wings uniformly infuscate; abdomen of female ferruginous; range: Saskatchewan, British Columbia, and Utah.
   4c. nubilipennis abdominalis, new subspecies
   Wings hyaline to weakly infuscate, the front wing more or less distinctly banded except in some males that have the wings hyaline 2
2. Hind femur black; range: east of Rocky Mountains.
   4a. nubilipennis luctuosus (Provancher)
   Hind femur ferruginous; range: Colorado.
   4b. nubilipennis nubilipennis (Cresson)

4a. Xylophrurus nubilipennis luctuosus (Provancher), new status

Mesochorus luctuosus Provancher, 1874, Naturaliste Canadien, vol. 6, p. 299; ♀. Type: ♀, Quebec (Quebec).

Cryptoideus anthracinus Cushman, 1924, Proc. U.S. Nat. Mus., vol. 64, art. 4, p. 7; ♀. Type: ♀, Lyme, Conn. (Washington).

Black. Hind orbit and upper part of frontal orbit usually narrowly fulvous; clypeus and mandible partly ferruginous; female flagellum with a white band that covers about 4 segments; wings hyaline to weakly infuscate, the front wing with a more or less distinct broad infuscate band just before areolet and its apex infuscate. In some of the small males with hyaline wings the markings on the front wing are entirely absent.

Specimens: ♀, reared from *Agrilus champlaini* in *Ostrya virginica*, Lyme, Conn., Apr. 28, 1913, H. B. Kirk (Washington). ♂, reared from twig infested with *Agrilus*, Orlando, Fla., 1919, W. W. Yothers (Washington). ♀, Naubinway, Mich., June 6, 1957, H. Townes (Townes). ♀, Mount Washington, N. H. (Washington). ♂, Sag Harbor, N.Y., Mar. 7, 1949, Roy Latham (Washington). ♂, Ithaca, N.Y., May 14, 1930, P. P. Babiy (Townes). ♀, McLean Reservation, Tompkins Co., N.Y., May 22, 1937, H. Townes (Townes). ♀, reared from borer in *Populus*, Hymers, Ont., June 10 to 19, 1913, H. Dawson (New York). ♂, Jockvale, Ont., May 28, 1934, G. S. Walley (Ottawa). ♂, Aylmer, Que., May 25, 1934, G. S. Walley (Ottawa). ♂, reared from *Oberea praelonga* in *Cornus stolonifera*, Hull, Que., May 9, 1956, S. D. Hicks (Ottawa). ♀, Hull, Que., May 26, 1923, R. Ozburn (Ottawa). 2♂, Bolivar, W. Va., Sept. 22 and 24, 1942, H. Townes (Townes). ♀, reared from *Saperda candida*, May 18 (Townes).

This subspecies ranges from southeastern Canada to Florida.

4b. Xylophrurus nubilipennis nubilipennis (Cresson)

Cryptus nubilipennis Cresson, 1864, Proc. Ent. Soc. Philadelphia, vol. 3, p. 291; ♀. Lectotype: ♀, Colorado (Philadelphia).

Male: Unknown.

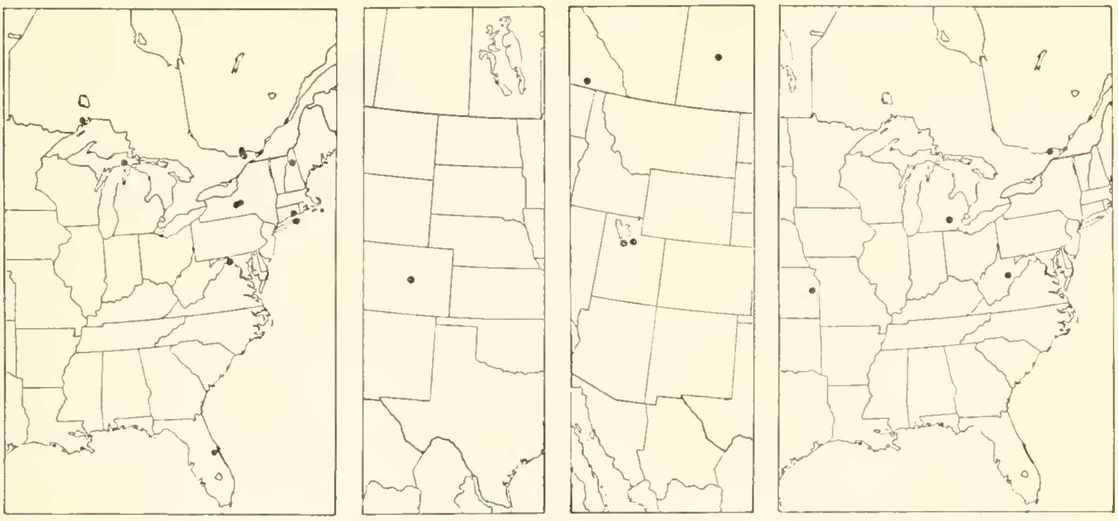
Female: Black. Orbit narrowly fulvous except in front below; clypeus and mandible largely ferruginous; flagellum with an incomplete white band covering about 2.7 segments; scutellum and propodeum sometimes mostly ferruginous; wings tinged with brown, the front wing with a brown band just before areolet and its apex brownish; legs beyond trochanters ferruginous, the basal 0.3 of front tibia infuscate, all tibiae more or less infuscate, and all tarsi fuscous brown.

Specimens: ♀ (lectotype), Colorado (Philadelphia). ♀, "*Betula fontinalis*," Larkspur, Colo., George Hofer (Washington).

4c. Xylophrurus nubilipennis abdominalis, new subspecies

Male: Specimens which are presumed to represent the male of this subspecies are black, with the hind and upper front orbits narrowly marked with fulvous, mandible partly ferruginous, front legs partly brownish, and wings with a uniform weak infuscation.

Female: Black. Orbit with a narrow fulvous mark behind and above in front; clypeus and mandible mostly fulvoferruginous; scape in front and basal three segments of flagellum more or less fulvous;



FIGURES 271–274.—Localities: 271 (left), *Xylophrurus nubilipennis luctuosus;* 272 (center, left), *X. n. nubilipennis;* 273 (center, right), *X. n. abdominalis;* 274 (right), *X. agrili.*

flagellum sometimes with an incomplete band covering about 3 segments; legs beyond trochanters ferruginous, the front legs sometimes partly infuscate; hind coxa sometimes partly ferruginous; abdomen ferruginous, the first segment sometimes blackish at base.

The type female differs from the paratype females in having the antenna almost entirely black, with only a tinge of fulvous on scape and first three segments of flagellum, and no white band on flagellum. The fourth segment of the flagellum is 3.0 as long as wide. In the paratype females it is about 3.8 as long as wide.

Type: ♀, Vernon, Utah, May 1, 1936, G. F. Knowlton and C. F. Smith (Washington, USNM 63831).

Paratypes: ♀, Robson, B. C., Apr. 21, 1940, H. R. Foxlee (St. Paul). ♀, Robson, B. C., May 16, 1947, H. R. Foxlee (Ottawa). ♂, Robson, B. C., Sept. 27, 1938, H. R. Foxlee (Townes). ♂, Saskatoon, Sask., May 12, 1925, Kenneth M. King (Ottawa). ♀, Vineyard, Utah, April 29, Tom Spalding (Townes).

This subspecies is known from Saskatchewan, British Columbia, and Utah.

5. Xylophrurus agrili (Viereck)

Xylophruridea agrili Viereck, 1912, Proc. U.S. Nat. Mus., vol. 42, p. 646; ♀. Type: ♀, French Creek, W. Va. (Washington).

BIOLOGY: Brooks, 1914, Journ. Agr. Res., vol. 3, p. 184.—1923, Monthly Letter U.S. Dep. Agr., Bur. Ent., No. 108, p. 3.

Front wing 5.0 to 7.0 mm. long; head about 1.02 as wide across temples as across eyes; temple with coarse, strong, very close punctures that are a little confluent in rows and with a little weak wrinkling between; fourth segment of female flagellum about 3.5 as long as wide; apical carina of propodeum present only laterally, its median 0.5±

lacking; second tergite mat, with moderate-sized punctures that are separated by about 0.5 their diameter; ovipositor sheath about 0.33 as long as front wing; teeth on apex of ovipositor moderately close.

Black. Hind orbit on upper 0.6± and top part of front orbit often narrowly fulvous; clypeus and mandible partly ferruginous; flagellum of female rarely with a white band.

Specimens: ♂, Baldwin [City], Kans., Apr. 11, 1898, J. C. Bridwell (Washington). ♂, ♀, Ann Arbor, Mich., May 6 and 28, 1959, H. and M. Townes (Townes). ♂, Ann Arbor, Mich., Sept. 28, 1959, H. and M. Townes (Townes). ♂, Rockcliffe, near Ottawa, Ont., May 29, 1942, G. S. Walley (Ottawa). 5♂, 1♀, reared from *Agrilus vittaticollis*, May 2, 1912, Sept. 24, 1912, and 1914, F. E. Brooks (Washington and Townes).

This species occurs in the Carolinian fauna.

2. Genus Echthrus

FIGURE 324,b

Echthrus Gravenhorst, 1829, Ichneumonologia europaea, vol. 3, p. 861. Type: *Ichneumon reluctator* Linnaeus; designated by Westwood, 1840.

Sphaetes Bremi, 1849, Stettiner Ent. Zeitung, vol. 10, p. 95. Type: (*Sphaetes crassicrus* Bremi)=*reluctator* (Linnaeus); monobasic.

Karaechthrus Uchida, 1929, Ins. Matsumurana, vol. 3, p. 176. New synonymy. Type: *Karaechthrus tuberculatus* Uchida; original designation.

Bioleter Meyer, 1930, Ann. Mus. Zool. Acad. Sci. U.S.S.R., vol. 31, p. 169. New synonymy. Type: (*Bioleter eos* Meyer)=*tuberculatus* (Uchida); original designation.

Front wing 7.5 to 20 mm. long; clypeus small to moderately large, usually with a median apical tooth; sternaulus moderately strong; pleural carina present; basal transverse carina of propodeum absent or vestigial; apical transverse carina of propodeum complete, often forming weak sublateral crests; areolet large, pentagonal; nervulus basad, opposite, or distad of basal vein; nervellus broken above, at, or below the middle; first tergite without a subbasal lateral tooth, its spiracle a little before the middle, its median dorsal carinae absent; second tergite mat, not distinctly punctate (with distinct, usually rather dense punctures in all other Nearctic genera of the subtribe); ovipositor sheath 1.05 to 1.5 as long as front wing; ridges on ovipositor tip close together; tips of lower valves of ovipositor not always enclosing tip of upper valve.

Echthrus is a small genus, confined to the Holarctic region. It is divisible into three species groups as defined below. In America there are three wide ranging species, each of which has several subspecies. Adults occur in woodlands in late spring and the first half of summer. They are frequently seen on or about large dead tree trunks. The hosts are wood boring Coleoptera.

Key to the species groups and to the Nearctic species of Echthrus

1. Apical margin of clypeus truncate, without a median tooth; nervellus broken far below the middle. Tuberculatus group (p. 487) . . (Not Nearctic)
   Apical margin of clypeus with a median tooth (varying from small to large); nervellus broken a little below, at, or somewhat above the middle . . . 2
2. Nervulus more or less basad of basal vein; clypeus with a large median tooth; apex of ovipositor sheath with a single terminal point. Abdominalis group (p. 487) . . . . **1. abdominalis** Cresson
   Nervulus usually at or distad of basal vein, but sometimes basad; clypeus with a small median tooth; apex of ovipositor sheath with a pair of terminal points. Reluctator group (p. 493) 3
3. Apical 0.4 of clypeus weakly impressed, the apical margin with a moderately small median tooth, on each side of which the margin is impressed; second tergite mat and weakly roughened; punctures on mesoscutum weaker, those on the hind 0.3 rather indistinct; abdomen always black . **2. niger** Cresson
   Apical 0.3 of clypeus strongly impressed, the apical margin with a very small median tooth; second tergite mat and smooth; punctures on mesoscutum stronger, those on the hind 0.3 distinct; abdomen often partly or entirely ferruginous . . . . **3. adillae** Davis

I. TUBERCULATUS GROUP

Clypeus small, its apex truncate, without a median tooth; nervulus basad of basal vein; nervellus broken far below the middle; ovipositor tip with its lower valve hardly at all enclosing the upper valve. We have no information about the armature of the apex of the ovipositor sheath.

This group includes *Karaechthrus tuberculatus* Uchida 1929, from Sachalin and Siberia. *Bioleter eos* Meyer, 1930, is a synonym of *tuberculatus* (new synonymy). We have seen the types of both *tuberculatus* and *eos* and, according to our notes, they represent the same species.

II. ABDOMINALIS GROUP

Clypeus large, with a large median apical tooth; nervulus basad of basal vein; nervellus broken near middle or a little below; ovipositor tip with its lower valve enclosing lower 0.3 to 0.5 of upper valve; apex of ovipositor sheath with a single terminal point. Face of male usually with a broad yellow or white mark on each side, beginning near antennal socket and extending ventrally, often covering the cheek; face of female entirely black or with some portion or trace of the white markings of male, especially on cheek; thorax entirely black.

This group includes *Echthrus abdominalis* Cresson 1868, from North America and *E. rufipes* Uchida 1929, from Japan and Sachalin.

1. Echthrus abdominalis Cresson

Front wing of male 7.5 to 13.3 mm. long, of female 9.4 to 15.5 mm. long; clypeus rather flat, but apically impressed on each side to form a large, broadly triangular median point; mesoscutal punctures separated on the average by about 0.7 their diameter; inflated portion of female front tibia dorsally with a weak median longitudinal trough, the swelling asymmetric, its hind side shorter and more protuberant than front side; second and following tergites smooth, uniformly mat, the hair sockets on second tergite separated by about 1.2 the length of the hairs, somewhat denser on third and following tergites; ovipositor tip with its lower valve enclosing only the lower 0.3± of upper valve.

The species *abdominalis* is transcontinental in the Canadian and Transition zones. There are four subspecies, as keyed and described below. The account below leaves out of consideration a male and female from Wyoming, which may represent a fifth subspecies. The female is black, with fulvous legs, an incomplete white band covering 3 flagellar segments, scape black, and wings faintly infuscate. The male is colored the same, but lacks the flagellar band and has front of scape, vague spot on lower part of facial orbit, cheek at base of mandible, and subbasal part of mandible stramineous. Data on these two are: ♀, Canyon Junction, Yellowstone National Park, July 28, 1957, Gerald Proctor (East Lansing). ♂, Powder River Pass at 9,000 ft., Wyo., June 30, 1940, H. and M. Townes (Townes).

Our collections of the species have always been in woods containing northern conifers.

The subspecies may be distinguished as follows:

1. Coxae and trochanters black or piceous; wings somewhat infuscate; range: central and southern Rocky Mountains.
1d. abdominalis infuscus, new subspecies
Coxae and trochanters fulvous; wings with a weak brownish tinge 2
2. Males 3
Females 6
3. Abdomen partly to entirely fulvous; range: Alberta and British Columbia to Wyoming and central California.
1a. abdominalis vancouverensis (Bradley), some specimens
Abdomen entirely black 4
4. Range: Atlantic Ocean to Michigan . **1b. abdominalis abdominalis** Cresson
Range: Pacific Ocean to Rocky Mountains 5
5. Range: California in the San Francisco area.
1c. abdominalis dimidiatus, new subspecies
Range: Montana and British Columbia to Oregon.
1a. abdominalis vancouverensis (Bradley), some specimens
6. Scape fulvous in front; abdomen entirely fulvous; range: Alberta and British Columbia to Wyoming and central California.
1a. abdominalis vancouverensis (Bradley)
Scape piceous or black in front 7

7. White mark on flagellum covering about 6 segments; abdomen entirely fulvous, or sometimes entirely black; range: Atlantic Ocean to Michigan.
1b. abdominalis abdominalis Cresson

White mark on flagellum covering 3 or 4 segments; abdomen blackish with the second tergite and more or less of the adjacent part of first and third tergites dusky fulvous; range: San Francisco area of California.
1c. abdominalis dimidiatus, new subspecies

1a. Echthrus abdominalis vancouverensis (Bradley), new status

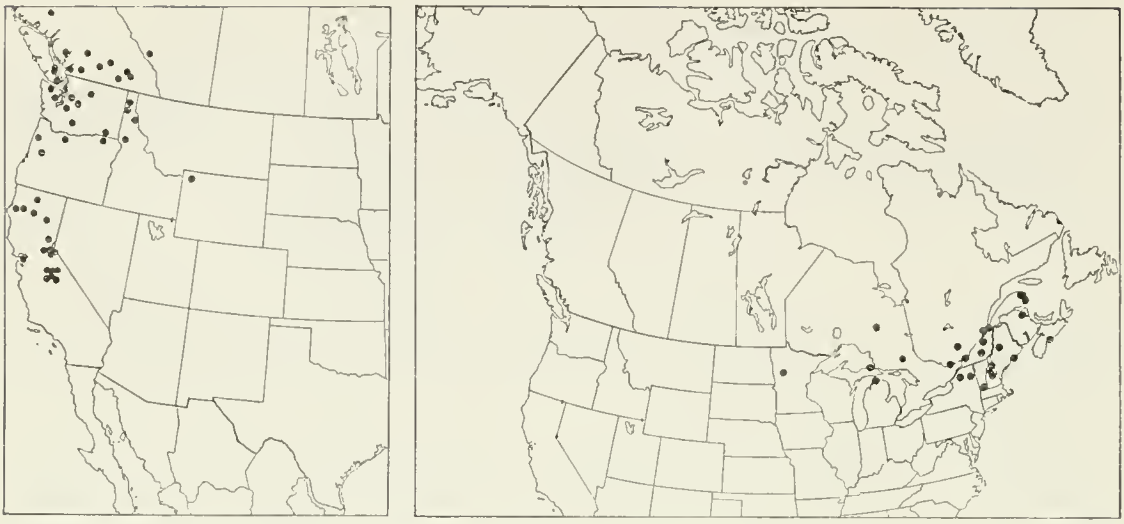
Dyseidopus vancouverensis Bradley, 1902, Ent. News, vol. 13, p. 307; ♂. Type: ♂, Vancouver, B.C. (Ithaca).

Colored like the subspecies *abdominalis* except that scape of female is mostly or entirely fulvous with its back side more or less infuscate, white markings on head of male average more extensive, scape of male sometimes fulvous in front, and abdomen of male varying from entirely black to entirely fulvous, often fuscous basally and apically and fulvous in the middle.

Males from the northern part of the range usually have the abdomen black or partly blackish. Those from California always have it mostly or entirely fulvous.

Specimens (61♂, 67♀): From Alberta (Banff on east face of Rundle Mt. at 5,000 to 7,000 ft.); British Columbia (Bowser, Granite Peak, Kaslo, Lillooet, Midday Creek in Indian Meadows, Mystery Glacier at 4,000 ft., Robson, Sandon, Steelhead, Terrace, Trinity Valley, Stanley Park in Vancouver, Victoria, and Wellington); California (5–10 miles northeast of Bartle in Siskiyou Co., Berkeley, Buck's Lake in Plumas Co., Chowchilla Mt. in Sierra National Forest, Donner Pass, Echo Lake, Fish Camp, Giant Forest in Tulare Co., near Glacier Point in Yosemite Park, Humboldt Co., Lake Alpine, Leevining, Smoky Jack Camp in Yosemite Park, Strawberry, Summit Lake in Shasta Co., "Toll gate in M. Weston Park at 5,000 ft.," Trinity Co. at 6,000 ft., and Wright's Lake in El Dorado Co.); Idaho (Athol, "Camp Creek at Krassel Ranger Station," "Camp Howard," Moscow Mt., Priest Lake at Coolin, and Wallace at 3,000 ft.); Oregon (Boyer, Mount Hood at 4,000 ft., Sweet Home, and Toll Gate [in the Blue Mts.]); Washington ("Boulder Cave," Easton, Godman Springs in Blue Mts. at 6,000 ft., Hurricane Ridge in Olympic National Forest, Lake Chelan at Lucerne, Lake Cushman, Mount Rainier at 4,700 ft., Red Mt., and West Klickitat on Mount Adams at 3,500 ft.); and Wyoming (Old Faithful [Geyser] in Yellowstone Park).

Dates of collection are mostly from May 10 to July 23. Those outside of this range are: April 11, 23, and 29 at Robson, B.C.; May 6 in Humboldt Co., Calif.; July 30 at Lillooet, B.C.; July 31 at Sandon, B.C.; August 6 on Mystery Glacier at 6,000 ft., B.C.; and August 21 at Boyer, Oreg.



FIGURES 275, 276.—Localities: 275 (left), *Echthrus abdominalis vancouverensis;* 276 (right), *E. a. abdominalis.*

We have found this subspecies abundant on large trunks and logs of *Pinus*, that have usually been dead for several years and are bare of bark. Males fly to these and explore about, beginning at or near the bottom and working upwards. Females are very wary and hard to catch.

This subspecies ranges from southern British Columbia and Alberta to central California and Yellowstone Park, Wyo.

1b. Echthrus abdominalis abdominalis Cresson

Echthrus abdominalis Cresson, 1868, Canadian Ent., vol. 1, p. 37; ♀. Type: ♀, Ottawa, Ont. (Philadelphia).

Mesochorus Saint-Cyri Provancher, 1874, Naturaliste Canadien, vol. 6, p. 299; ♀. Lectotype: ♀, Quebec (Quebec).

Male: Black. Broad stripe on side of face beginning at level of antennal socket and extending downward (usually to cover cheek), sometimes central part of clypeus, and sometimes subbasal area on mandible, white; scape white or black in front; palpi, tegula, obscure area on subtegular ridge, and legs, fulvous; wings with a faint brownish tinge.

Female: Black. Scape piceous to black; palpi, tegula, legs, and usually the abdomen fulvous, the base of first abdominal segment sometimes fuscous; cheek next to base of mandible usually with a brown or stramineous area; lower lateral part of face sometimes with a poorly defined brownish area; mandible fulvous to piceous; flagellum with a white band (complete) that covers about 6 segments; wings with a light brownish tinge.

Nearly all females have the abdomen fulvous, but five, as follows, have it black: ♀, Itasca Park, Minn., May 30, 1936, A. B. Gurney

(St. Paul). ♀, Halifax, N.S., July 7, 1915, J. Perrin (Ottawa). ♀, Bathurst, N.B., June 21, J. N. Knull (Ottawa). ♀, Laurel Lake, near Jacksonville, Vt., June 25, 1935, H. D. Pratt (Townes). ♀, Trout Lake Nursery, Vilas Co., Wis., June 20, 1950, R. D. Shenefelt (Madison).

Specimens, excluding the five above (5♂, 26♀): From Maine (Bar Harbor and Kokadjo); Michigan (Douglas Lake and Whitefish Point); Minnesota (Itasca Park); New Brunswick (Bathurst); New Hampshire (Franconia, Mount Washington, and Squam Lake); New York (Cranberry Lake and Indian Falls on Mount Marcy); Nova Scotia (Halifax); Ontario (Smoky Falls on Mattagami River and Sudbury); Quebec (Aylmer, Berthier, Gaspé, Knob Lake at 54°47′ N. 66°47′ W., Levis, Montreal, Nominingue, Percé, and Sherbrooke); and Vermont (Laurel Lake near Jacksonville).

Collection dates are mostly in June and early July. The earliest and latest dates are: May 29 at Berthier, Que.; May 30 in Itasca Park, Minn.; June 5 and 7 at Laurel Lake, near Jacksonville, Vt.; June 6 at Levis, Que.; July 13 at Gaspé, Que.; July 17 at Knob Lake, Que.; and July 21 at Bathurst, N.B.

This subspecies ranges from the Atlantic Ocean to Minnesota, in the Canadian zone.

1c. Echthrus abdominalis dimidiatus, new subspecies

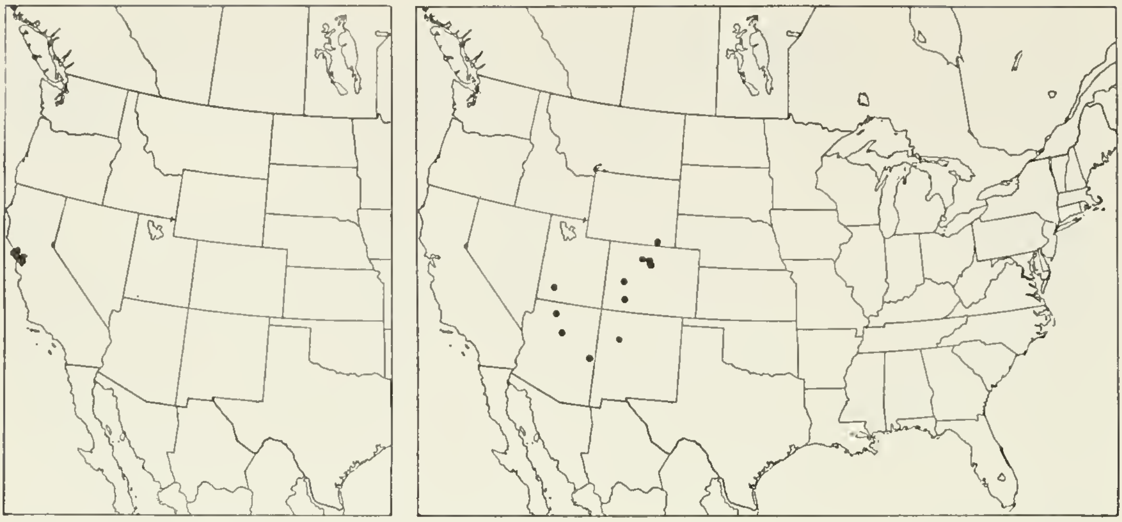
Male: Colored like male of subspecies *abdominalis*, or like males of subspecies *vancouverensis* with blackish abdomen.

Female: Black. Cheek partly stramineous, at least next to mandible; palpi and legs fulvous; scape piceous to black; flagellum with white band, complete or incomplete, covering about 3 segments; tegula brown; wings with a light brown tinge; abdomen fuscous, the second tergite and more or less of adjacent parts of first and third tergites dusky fulvous.

Type: ♀, Berkeley, Calif., May 12, 1912 (Washington, USNM 63832).

Paratypes: ♂, Berkeley, Calif., April 1935 (Townes). ♀, Berkeley, Calif., May 6, 1957 (Davis). ♀, Inverness, Calif., May 22, 1910, E. C. Van Dyke (Townes). ♀, Mill Valley, Marin Co., Calif., June 11, 1949, A. Hartel (Berkeley). ♀, reared from cerambycid in madrone, Mount Tamalpais, Marin Co., Calif., Apr. 3, 1914, E. C. Van Dyke (Berkeley). ♂, Mount Tamalpais, Marin Co., Calif., May 7, 1911, E. C. Van Dyke (San Francisco). ♂, Richmond, Calif., Mar. 4, 1948, N. D. Waters (Moscow).

This subspecies occurs in the vicinity of San Francisco, Calif.



Figures 277, 278.—Localities: 277 (left), *Echthrus abdominalis dimidiatus;* 278 (right), *E. a. infuscus.*

1d. Echthrus abdominalis infuscus, new subspecies

Male: Black. Cheek stramineous next to mandible, this area sometimes continuous with a stramineous area on lower lateral part of face; lower lateral part of face and basal part of mandible with or without a stramineous spot; palpi fuscous; tegula dark brown; coxae and trochanters black or dark piceous; legs beyond trochanters dusky fulvous, the femora usually somewhat darkened basally; wings weakly infuscate.

Female: Black. Flagellum with a median whitish or light brown stripe that covers about 2.5 segments; palpi and tegula fuscous; coxae and trochanters blackish or piceous; legs beyond trochanters and abdomen reddish brown, the basal 0.5 to 0.8 of first abdominal segment black.

Type: ♀, reared from *Pinus ponderosa*, Bright Angel Point, North Rim of Grand Canyon, Ariz., June 28, 1922, George Hofer (Washington, USNM 63833).

Paratypes: 2♂, 1♀, near Alpine, Ariz., May 28, 1947, H. and M. Townes (Townes). ♂, ♀, Flagstaff, Ariz., July 8, 1941, R. H. Beamer (Lawrence). ♀, Boulder Co. at 9,500 ft., Colo., June 18 to July 19, 1933, J. C. Jones (St. Paul). ♀, R. M. Boys Camp, Rocky Mountain National Park, Colo., July 11, 1933, Helen Rodeck (St. Paul). ♀, Gothic at 9,600 ft., Colo., July 20, 1929, L. O. Jackson and Mary J. Brown (Washington). ♀, near Nederland, 9,600 ft., Colo., July 3, F. M. Carpenter (Cambridge). ♀, Twin Sisters at 10,000 ft., Colo., July 11, 1926, E. C. Van Dyke (San Francisco). ♀, Wolf-Fall Creeks, Mineral Co., Colo., June 20, 1919 (New York). ♀, Jemez Springs, 6,400 ft., N. Mex., June 2, 1916, John Woodgate (Ithaca). ♂, ♀, Navajo Lake, 9,000 ft., Utah, June 17, 1940, R. M. Bohart (Townes).

♀, Albany Co., Wyo., July 4, 1949, D. G. Denning (Townes). 2♀, Centennial, Wyo., July 16, 1933, and no date, I. H. Blake (Washington).

This subspecies occurs in the Rocky Mountains from southern Wyoming and Utah to New Mexico and Arizona.

III. RELUCTATOR GROUP

Clypeus with a medium sized or small apical tooth; nervulus at, distad, or sometimes basad of basal vein; nervellus broken usually above the middle but sometimes at or a little below; ovipositor tip with its lower valve completely enclosing upper valve; apex of ovipositor sheath with a pair of terminal points. Head of male usually black but sometimes (as in *E. niger niger*) with a white mark on each side of face, a spot on clypeus, and part of cheek white; face of female black; thorax entirely black, or rarely with brown markings.

This group includes the European *Ichneumon reluctator* Linnaeus 1758, the Siberian and Japanese *Echthrus sibericus* Kokujev 1903, and the two American species described below. Among the American species, *E. niger* Cresson is very close to *sibericus*, differing most noticeably in having the mesoscutal punctures smaller and weaker. The two may prove to be only subspecifically distinct.

Echthrus nigripes Uchida 1929, described from Japan, was synonymized with *sibericus* by Meyer in 1934 (Tables systématiques des hyménoptères parasites (fam. Ichneumonidae) de l'URSS et des pays limitrophes, vol. 3, p. 233). We have seen both types, but our notes on the type of *sibericus* are too meager either to confirm or contradict the synonymy. The above comparison of "*sibericus*" with *niger* is based on a homotype of *nigripes*, from Sapporo, Japan.

2. Echthrus niger Cresson

Front wing of male 6.5 to 12.0 mm. long, of female 10.0 to 14.5 mm. long; clypeus with its apical 0.4 weakly impressed, with a moderately large median apical point, on each side of the point more strongly impressed; punctures on mesoscutum rather fine and weak, finest and weakest on hind half, where they are separated by about 2.0 their diameter; second tergite mat and finely, weakly roughened.

The species is transcontinental in the Canadian and Transition zones. It occurs in deciduous woods; the other two Nearctic species of *Echthrus* occur in coniferous woods. There are three subspecies, as treated below:

1. Femora fulvous; range: Quebec to British Columbia. **2a. niger rufopedibus** Harrington
   Femora black or blackish 2
2. Tegula dark brown; swollen part of female front tibia with some white on front and hind sides, the rest brown; range: Quebec and Ontario. **2b. niger emaculatus,** new subspecies

Tegula white; swollen part of female front tibia white, brown at apex and beneath; range: Nova Scotia, Quebec, and Ontario to North Carolina.
2c. niger niger Cresson

2a. Echthrus niger rufopedibus Harrington, new status

Echthrus rufopedibus Harrington, 1893, Canadian Ent., vol. 25, p. 31; ♀. Type: ♀, Montreal, Que. (Ottawa).

Black. Mandible ferruginous; palpi and tegula brown; labrum light fulvous; front of scape yellowish or fulvous in male, dusky fulvous in female; flagellum of female with a white band covering about 3.5 segments; front and middle legs, hind coxa, hind trochanters, and hind femur fulvous, the apex of hind femur narrowly infuscate; hind tibia and tarsus black or piceous; wings subhyaline.

Specimens: ♂, Edmonton, Alta., May 20, 1924, G. Salt (Washington). ♀, Waterton Lakes, Alta., June 28, 1929, J. H. Pepper (Ottawa). ♀, Fort Nelson, B.C., June 8, 1948, M. T. Hughes (Ottawa). ♂, Aweme, Man., June 1, 1917, N. Criddle (Ottawa). ♀, Cedar Lake, Man., July 1936, C. T. Brues (Cambridge). ♀, Houston Co., Minn., May 23, 1936, Robert Cottrell (St. Paul). ♀, Itasca Park, Minn., May 30, 1936, A. B. Gurney (St. Paul). ♀, Lake Itasca, Minn., June 11 (St. Paul). ♀, Sudbury, Ont., 1888 (Ottawa).

This subspecies ranges from Montreal, Que. to British Columbia.

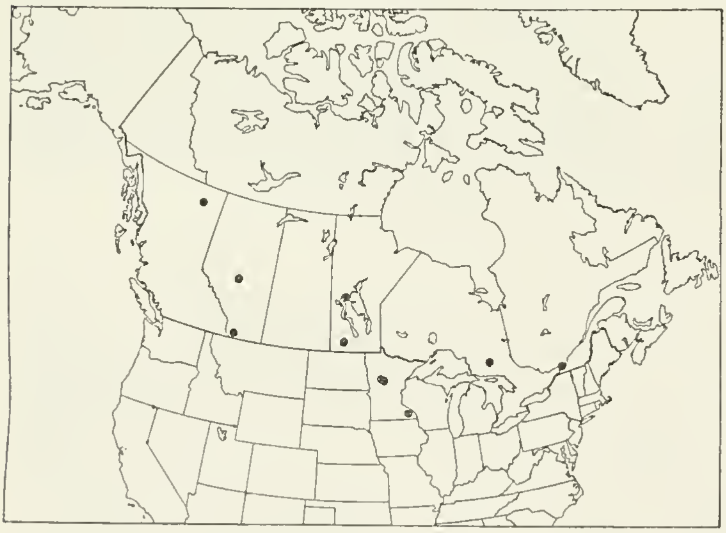
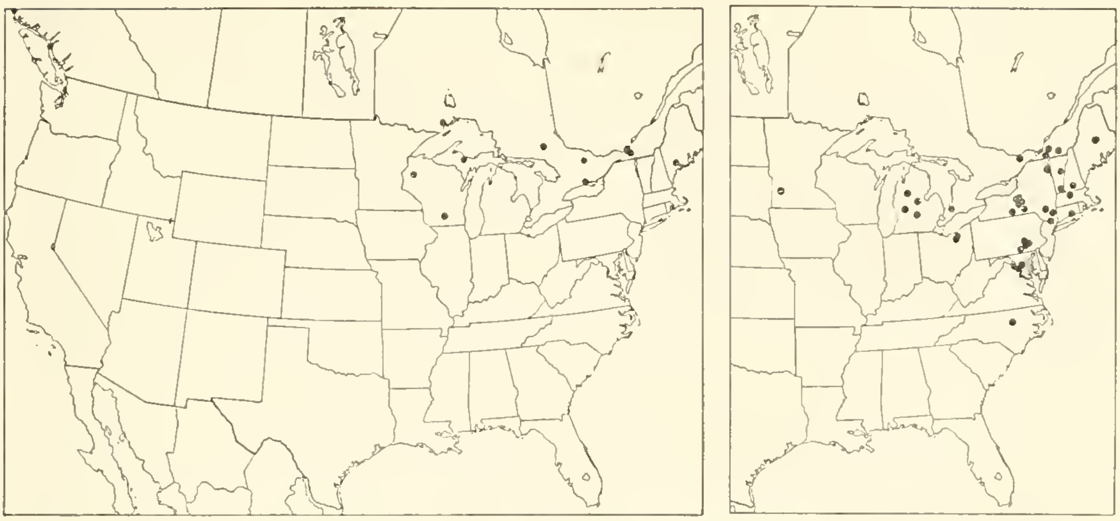


Figure 279.—Localities for *Echthrus niger rufopedibus*.

2b. Echthrus niger emaculatus, new subspecies

Male: Black. Labrum white; scape whitish in front; mandible dusky ferruginous; palpi and tegula brown; front and middle femora whitish at apex; front and middle tibiae whitish, blackish below and at apex; legs blackish or piceous except where described as whitish, the hind tibia and tarsus the darkest; wings subhyaline.

Female: Black. Mandible partly ferruginous; labrum and band on flagellum covering about 3.5 segments, white; palpi and tegula dark



FIGURES 280, 281.—Localities: 280 (left), *Echthrus niger emaculatus;* 281 (right), *E. n. niger.*

brown; ground color of legs dark brown or blackish, the apex of front and middle femora, and extreme base of their tibiae usually stramineous; front tibia brown with a poorly defined, broad whitish stripe on front and back sides; hind tibia and tarsus blackish; wings subhyaline.

Type: ♀, Montreal, Que., June 14, 1932, J. I. Beaulne (Washington, USNM 63834).

Paratypes: ♀, on dead *Ulmus*, Augusta, Maine, June 23, 1947, A. E. Brower (Townes). ♀, Negaunee, Marquette Co., Mich., June 15, 1957, R. W. Hodges (East Lansing). ♂, Belleville, Ont., June 1940, M. Thompson (Ottawa). ♀, Golden Lake, Ont., June 9, 1952, G. S. Walley (Ottawa). ♂, Sudbury, Ont., 1891 (Ottawa). ♀, Thunder Bay Beach, Ont., July 28, 1941, H. S. Parish (Townes). 2♀, Montreal, Que. (Ithaca and Townes). ♀, Rigaud, Que., May 24, 1902 (Ithaca). ♀, Madison, Wis., May (Madison). ♀, Shell Lake, Wis., May 30, 1935 (Madison). 2♀, no data (Washington and Dreisbach).

This subspecies ranges from Maine to Wisconsin.

2c. Echthrus niger niger Cresson

Echthrus niger Cresson, 1868, Canadian Ent., vol. 1, p. 37; ♀. Type: ♀, Ottawa, Ont. (Philadelphia).

BIOLOGY: Harrington, 1893, Canadian Ent., vol. 25, p. 32.

Male: Black. Facial orbit (at least below), usually connecting area on cheek, usually clypeus, labrum, front of scape, tegula, usually subtegular ridge, apex of front and middle femora, front and middle tibiae except beneath and sometimes at apex, and sometimes base of front and middle basitarsi, white; wings hyaline.

Female: Black. Labrum, band on flagellum covering 3.7 segments, tegula, often subtegular ridge, front tibia (except for brown base, apex, and stripe beneath), and often short stripe on upper side of middle tibia, white; extreme apices of front and middle femora and bases of front and middle tibiae often stramineous; wings subhyaline.

Specimens (20♂, 46♀): From Connecticut (Lyme); District of Columbia (Washington); Maine (Brownville); Massachusetts (Otter River); Michigan (Bath, Lake City, Kent Co., and Midland Co.); Minnesota (Florence); New Brunswick (Bathurst); New Hampshire (Jaffrey); New York (Avoca, Big Indian Valley in Catskill Mts., Crown Point, Elmira, Ithaca, Labrador Hollow and Labrador Lake in Cortland Co., McLean Reservation in Tompkins Co., Slide Mt. in Ulster Co., Southfields, and Syracuse); North Carolina (Raleigh); Nova Scotia (Kentville); Ohio (Bedford and Brecksville); Ontario (Ottawa and Strathroy); Pennsylvania (Harrisburg, Hummelstown, Inglenook, and Shiremanstown); Quebec (Brome, Hemmingford, and St. Hilare); Vermont (Laurel Lake near Jacksonville and Plainfield); and Virginia (Dead Run in Fairfax Co., and Great Falls).

Most specimens were collected in May and June. Unusually early and late records are: April 7 at Dead Run, Fairfax Co., Va.; April 15 at Washington, D.C.; "April" and May 6 at Ithaca, N.Y.; May 5 at Otter River, Mass., and at Harrisburg, Pa.; July 3 at Laurel Lake, near Jacksonville, N. H.; July 8 at Jaffrey, N. H.; and July 26 at Florence, Minn.

Reared specimens are: ♀, from *Saperda discoidea* in *Carya*, Shiremanstown, Pa., June 10, 1915, W. S. Fisher. ♀, from cocoon found in tunnel of *Saperda candida* in *Malus pumila*, Crown Point, N.Y., May 18, 1937, A. D. Hess. ♀, from ?*Anoplodera proxima* in *Salix*, Great Falls, Va., May 8, 1917, J. N. Knull. ♂, from *Populus*, Brownville, Maine, May 27, 1952. Other biological notes on pin labels state that a male was collected on a *Betula* trunk and a female on *Carya*.

This subspecies occurs in the Alleghanian fauna.

3. Echthrus adillae Davis

Front wing of male 7.8 to 16.0 mm. long, of female 10.5 to 20.0 mm. long; clypeus with its apical 0.3 strongly impressed, its apical margin with a small median tooth; punctures on mesoscutum moderately strong, those on hind half separated by about 1.5 their diameter; second tergite mat, quite smooth.

E. adillae is transcontinental in the Canadian and Transition zones. It parasitizes borers in large conifers. There are six subspecies, as keyed and described below:

1. Coxae ferruginous; abdomen ferruginous except for base of first segment; range: Sierra Nevada . . . . **3d. adillae rubidus,** new subspecies
   Coxae black or blackish; abdomen varying from almost entirely ferruginous to entirely black 2

2. Tibiae yellow 3
Tibiae fulvous to fuscous 4
3. Wings weakly tinged with brown; basal 3 segments of flagellum yellowish brown to dark brown, usually part yellowish brown and part dark brown; range: Maine, Quebec, and Ontario . **3e. adillae tibialis,** new subspecies
Wings medium brown; basal 3 segments of flagellum yellowish brown; range: New York to Virginia . . . . . . **3f. adillae brunneus,** new subspecies
4. Abdomen beyond second segment ferruginous; range: Cascade Mountains and vicinity. . . . . **3b. adillae semiruber,** new subspecies
Abdomen beyond second segment black, rarely partly black and partly ferruginous 5
5. Femora fulvous; range: Labrador to British Columbia and Colorado. **3a. adillae nigriventris,** new subspecies
Femora dark brown to black; range: Coastal British Columbia, Washington, and Oregon . . . . **3c. adillae adillae** Davis

3a. Echthrus adillae nigriventris, new subspecies

Black. Front of scape of male sometimes yellow or fulvous; mandible with a ferruginous tinge; labrum stramineous; palpi fulvous; female flagellum with a white band that covers about 3.5 segments; tegula blackish; coxae black; trochanters fulvous and fuscous; legs beyond trochanters fulvous, the apex of hind basitarsus, segments 2–4 of hind tarsus, and sides of inflated portion of female front tibia, yellowish fulvous; wings subhyaline, with a weak infuscation. Sometimes the femora, especially the hind femur, are partly infuscate. In one female from "Colorado," the apical 0.3 of the second tergite and apical 0.65 ± of the third and following tergites is ferruginous. In all others it is entirely black.

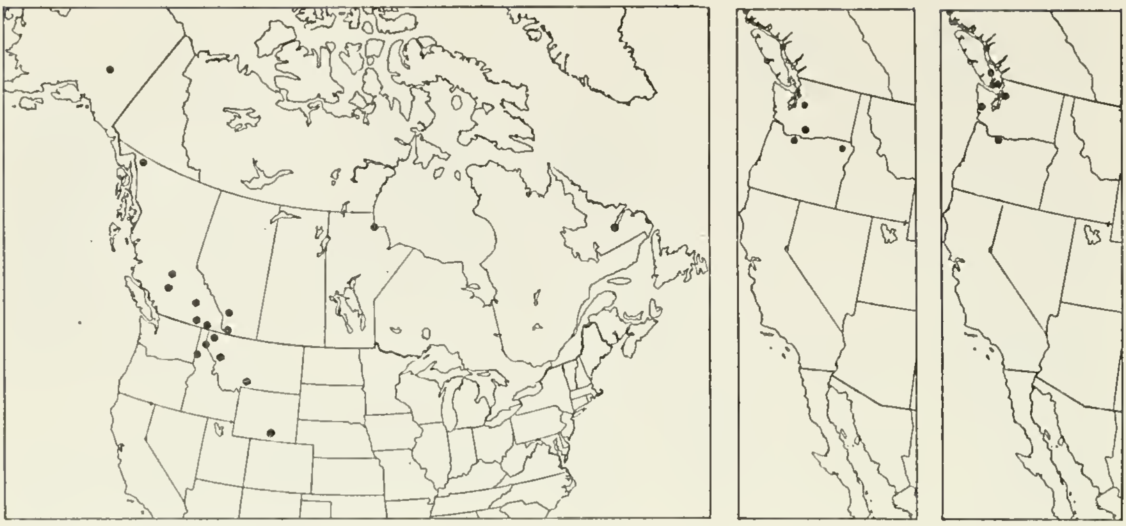
Type: ♀, Calgary, Alta., June 10, 1922, G. Salt (Washington, USNM 63835).

Paratypes (7♂, 18♀): From Alaska (Rampart); Alberta (Waterton [Park]); British Columbia (Atlin, Chilcotin, Clinton, Creston, Robson, and Vavenby); Colorado (Williams Cañon); Idaho (Moscow Mt., and Wallace at 3,000 ft.); Labrador (Goose Bay); Manitoba (Fort Churchill); and Montana (Belton, Madison River in Gallatin National Forest, and Missoula).

Dates of collection are mostly from May 25 to July 22. Those outside of this range are: April 26 at Robson, B.C.; May 3 at Belton, Mont.; May 14 at Creston, B.C.; July 27 at Wallace, Idaho; and August 25 at Wallace, Idaho.

There is one reared specimen: ♂, from *Paranthrene robiniae* form *perlucida* in *Pinus ponderosa*, Missoula, Mont., July 4, 1916, J. Brunner.

This subspecies occurs mostly in the northern part of the Rocky Mountains but ranges from Colorado to Alaska and eastward to Labrador.



Figures 282–284.—Localities: 282 (left), *Echthrus adillae nigriventris;* 283 (center), *E. a. semiruber;* 284 (right), *E. a. adillae.*

3b. Echthrus adillae semiruber, new subspecies

Black. Labrum stramineous; mandible with a ferruginous stain; palpi dark brown; female flagellum with a white band that covers about 3 segments; tegula blackish; coxae and trochanters black; femora brown to fulvous, if brown then pale brown or fulvous toward apices; front and middle tibiae and tarsi brownish fulvous; hind tibia and basitarsus fuscous brown, the apex of basitarsus stramineous; segments 2–4 of hind tarsus yellowish; fifth segment of hind tarsus brownish fulvous; wings weakly infuscate; abdomen ferruginous, the first segment black and basal part of second segment often fuscous.

Type: ♀, Easton, Wash. (Washington, USNM 63836).

Paratypes: ♀, Mount Hood, Oreg., 5,000 to 6,000 ft., July 1, 1927, E. C. Van Dyke (San Francisco). ♂, Wallowa Lake, Aneroid Lake Trail, 5,500 to 6,500 ft., Oreg., July 22, 1929, H. A. Scullen (Washington). ♀, West Klickitat, Mount Adams, 3,500 ft., Wash., July 1, 1925, L. A. Morley (Washington).

This subspecies occurs in Washington and Oregon.

3c. Echthrus adillae adillae Davis

Echthrus adillae Davis, 1895, Trans. Amer. Ent. Soc., vol. 22, p. 32; ♂. Type: ♂, Seattle?, Wash. (Philadelphia).

Black. Mandible with a ferruginous tinge; labrum pale fulvous; palpi and tegula blackish brown; female flagellum with a whitish band that covers about 3.5 segments; legs blackish brown or blackish, the apices of femora and tibiae and tarsi brown, the front and middle tibiae and tarsi of male pale brown; front side of inflated part of female front tibia, apex of hind basitarsus, segments 2 through 4 of hind tarsus, and usually segments 2 through 4 of middle tarsus, stramineous; wings subhyaline, faintly infuscate; abdomen black.

Specimens: ♀, Departure Bay, B.C., June 16, 1908, G. W. Taylor (Ottawa). ♀, Victoria, B.C., June 6, 1900, G. W. Taylor (Ottawa). ♂, Mount Hood at 3,000 to 6,000 ft., Oreg., June 22, 1925, E. C. Van Dyke (San Francisco). ♀, Friday Harbor, Wash., May 29, 1906, J. M. Aldrich (Washington). ♂, Hoquiam, Wash., May 27, 1904, Burke (Washington).

This subspecies occurs mostly in the Vancouver area.

3d. Echthrus adillae rubidus, new subspecies

Black. Front of scape of male sometimes ferruginous; mandible with a ferruginous tinge; labrum pale fulvous; palpi and tegula fulvous; female flagellum with a whitish band that covers about 2 segments; legs fulvoferruginous, the hind tibia weakly infuscate, the hind basitarsus fuscoferruginous with its apex yellowish, segments 2–4 of middle and hind tarsi yellowish, and fifth segment of hind tarsus yellowish fulvous; front side of swollen portion of female front tibia yellowish fulvous; wings distinctly infuscate, expecially in female, with weak purple iridescence; abdomen ferruginous, its first segment black basally.

Type: ♀, near Glacier Point, Yosemite National Park, Calif., July 16, 1948, H., M., G., D., and J. Townes (Washington, USNM 63837).

Paratypes (102♂, 100♀): From California (Alta, Angora Lake near Tahoe, Blue Lake in Lassen Co., Bluff Falls Public Camp in Tehama Co., Bridge Creek Camp in Lassen Co., Buck's Lake in Plumas Co., Chester, Cinder Cone in Lassen National Park, Cisco, Dardanelle, Davis Creek in Modoc Co., Donner Pass, Echo Lake in El Dorado Co., Fallen Leaf and Fallen Leaf Lake near Lake Tahoe, Fish Camp, near Glacier Point in Yosemite Park, Glen Alpine at Fallen Leaf Lake, Glen Alpine Creek near Tahoe, Gold Lake, Goose Lake in Siskiyou Co., Hackamore, Half Moon Lake near Tahoe, Hope Valley in Alpine Co., Huntington Lake in Fresno Co. at 7,000 ft., Leevining, Leland Meadow in Tuolumne Co., Littlegrass Valley in Plumas Co., May Lake in Yosemite Park at 10,500 ft., Mammoth Lakes, Meadow Valley in Plumas Co. at 3,500 to 4,000 ft., Meyers Station, Mineralking, Pigeon Flats in Tuolumne Co., Portola, 4 miles west of Quincy, Sagehen near Hobart Mills, Sequoia National Park at 7,000 to 9,000 ft., Smoky Jack Camp in Yosemite Park, Snow Flat in Yosemite Park at 8,700 ft., Strawberry, Summit, Summit Camp in Lassen Co., Summit Lake in Shasta Co., Tahoe City, Tallac Lake near Tahoe, Tamarack Flat in Yosemite Park, Warner Mts. in Modoc Co., and Wright's Lake in El Dorado Co.); Nevada; and Oregon (Crater Lake).

Collection dates are mostly in June and July. Those outside of this range are: April 29 in Yosemite Park, Calif.; May 5 at Chester, Calif.; and August 1 at Donner Pass, Calif.

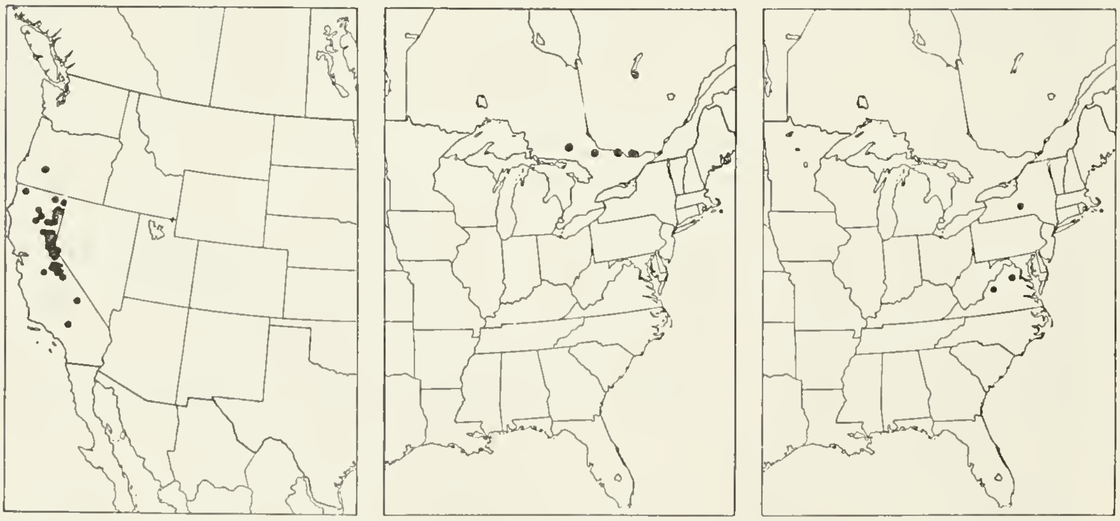
We have found the subspecies abundant about logs and standing trunks of large dead conifers, especially trunks of *Pinus lambertiana* and *P. ponderosa jeffreyi*. To attract the adults, such logs or trunks should have been dead for several years and largely bare of bark. The males come to them to explore about, beginning at or near the bottom of a trunk and working upwards. Females are more wary and harder to catch than males. When captured, both sexes give off the same strong, musty odor as species of *Trachysphyrus*.

This subspecies occurs in the Sierra Nevada, mostly in the Canadian zone.

3e. Echthrus adillae tibialis, new subspecies

Male: Black. A fulvous spot in lower lateral corner of face, another on cheek, and another covering clypeus; palpi yellowish fulvous; scape and pedicel yellowish fulvous, with a blackish stripe on outer side; first 14 segments of flagellum fulvous, the rest black; tegula, subtegular ridge, tibiae, and tarsi yellow; trochanters brownish fulvous, the first trochanter of middle and hind legs infuscate basally; front femur fulvous with its apex yellowish; middle femur brownish fulvous with its base and apex yellowish fulvous; hind femur brown with its base and apex yellowish fulvous; wings with a light yellowish brown tinge; abdomen black.

Female: Black. Mandible ferruginous; labrum stramineous; palpi brown; basal 3.5 segments of flagellum entirely brown or the brown partly replaced by pale yellow; flagellum with a pale yellow band extending from middle of fourth segment almost to apex of seventh; tegula brown; subtegular ridge often yellow; front and middle trochanters and femora fulvous to dark brown, the femora pale fulvous apically; tibiae yellow, the front tibia fulvous at base, apex, and



Figures 285–287.—Localities: 285 (left), *Echthrus adillae rubidus;* 286 (center), *E. a. tibialis;* 287 (right), *E. a. brunneus.*

beneath; tarsi yellow, the last segment brown; hind trochanters and femur blackish to brownish fulvous, the apex of femur fulvous; wings with a yellowish brown tinge; abdomen fulvous brown, the first tergite black, the basal 0.5± of second tergite, and sometimes part of following tergites infuscate.

Type: ♀, Aylmer, Que., June 11, 1924, E. B. Watson (Ottawa).

Paratypes: ♀, Brooksville, Maine, F. A. Eddy (Cambridge). ♀, Constance Bay, Ont., May 14, 1942, T. N. Freeman (Ottawa). ♀, North Bay, Ont., May 9, 1905 (Ithaca). ♀, Sudbury, Ont. (Ottawa). ♂, Aylmer, Que., May 30, 1925, C. B. Hutchings (Ottawa). 9♀, Aylmer, Que., June 11, 13, 15, 17, and 20, 1924, E. B. Watson, H. L. Viereck, and C. H. Curran (Ottawa). 5♀, Queen's Park, Aylmer, Que., May 29, 1922, and June 6, 16, 18, and 23, 1924, C. B. Hutchings (Ottawa). ♀, Mistassini Lake, 20 miles north of Mistassini Post, Que., June 16, 1955, J. R. McGillis (Ottawa). ♀, "Amherst," June 1, 1927 (St. Paul).

This subspecies occurs in Maine, Quebec, and Ontario.

3f. Echthrus adillae brunneus, new subspecies

Male: Unknown.

Female type: Black. Frontal orbit, center of face, mark on cheek, palpi, scape, and pedicel, brown; clypeus and mandible fulvoferruginous; first three flagellar segments brownish fulvous, the next 4 to 5 pale yellow, the rest black; tegula and subtegular ridge yellowish fulvous; median lobe of mesoscutum with a brownish stain on each side; postscutellum fulvous; front trochanters and femur fulvous; middle and hind first trochanters fuscous, stained with ferruginous apically; middle and hind second trochanters fulvous; middle and hind femora infuscate, fulvous at base and apex; tibiae and tarsi yellowish, the tibiae yellowish fulvous at base and front tibia yellowish fulvous beneath; wings dark brown; first abdominal tergite fulvous, fuscous basally, especially below, its apex with a yellowish tinge; second tergite brownish fulvous, its lateral edges infuscate; third tergite with a subapical transverse brownish fulvous area.

Paratype females: The female from Ithaca, N.Y., is colored much like the type but with reduced pale markings on head and body. The female from Brandy, Va., differs from type in having brown markings more extensive, the head, thorax, and middle and hind femora being mostly brown rather than blackish.

Type: ♀, Ramsey Draft, Augusta Co., Va., May 10, 1947, A. H. Clark (Washington, USNM 63838).

Paratypes: ♀, Ithaca, N.Y., May 8, 1936 (Townes). ♀, Brandy, Va., Feb. 21, 1951, O. Cartwright (Washington).

3. Genus Agonocryptus

FIGURES 325,a; 329,p

Agonocryptus Cushman, 1929, Proc. U.S. Nat. Mus., vol. 74, art. 16, p. 6. Type: *Mesostenus discoidaloides* Viereck; original designation.

Front wing 5.3 to 13 mm. long; clypeus small, its basal half convex and apical half flattened with usually a minute median tubercle or irregularity, its apical margin broadly truncate, without a median tooth; sternaulus weak; pleural carina absent; transverse propodeal carinae present, complete or the apical one obsolete medially, both carinae evenly arcuate, the apical carina near apex of propodeum; areolet small, short rectangular; nervulus basad of basal vein by about 0.4 its length; nervellus broken a little above middle; first tergite without a subbasal lateral tooth and without median dorsal carinae, its spiracle at or just basad of its midlength; ovipositor sheath about 0.44 as long as front wing; ridges on ovipositor tip moderately distant.

This is a moderately large genus, restricted to the Neotropic region except for the single Nearctic species described below.

Agonocryptus discoidaloides (Viereck)

FIGURES 338,e,f

Mesostenus discoidaloides Viereck, 1905, Trans. Kansas Acad. Sci., vol. 19, p. 319; ♀. Type: ♀, Rock Creek, 900 ft., Douglas Co., Kans. (Lawrence).

Front wing of male 5.3 to 8.4 mm. long, of female 6.5 to 11.5 mm. long.

Male: Head, body, and hind coxa marked with black, white, and fulvous as in figure 338,e; antenna black, the flagellum with a white band; labrum and palpi white; mandible brown, white basally; mesoscutum with a median elliptic white spot; front and middle coxae and first trochanters white, the middle first trochanter often

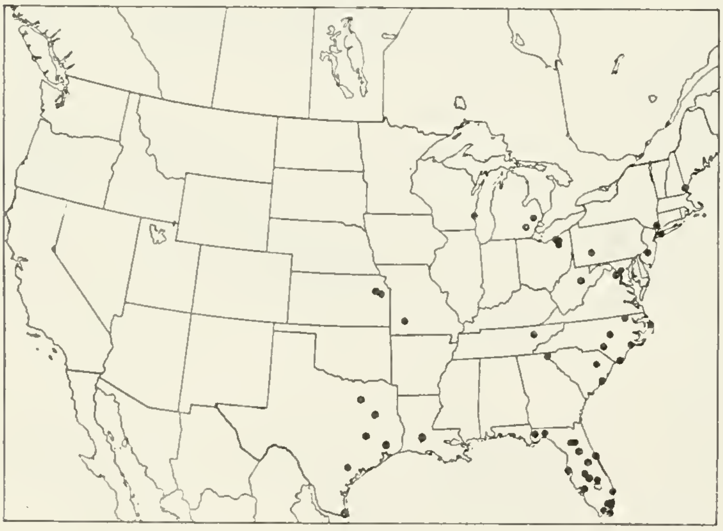


FIGURE 288.—Localities for *Agonocryptus discoidaloides*.

tinged with fulvous; front and middle second trochanters pale fulvous; front and middle legs beyond trochanters fulvous, their tarsi mostly brownish; hind trochanters, femur, and tibia fulvous, the apical 0.25± of the tibia infuscate; hind tarsus white, the basal third of its first segment black.

Female: Head, body, and hind coxa marked with black and white as in figure 338,f; antenna black, the flagellum with a broad white band; mandible blackish, white at base; labrum and palpi white, the last 2 or 3 segments of maxillary palpus and last segment of labial palpus brownish; mesoscutum with a median elliptic white spot; front and middle coxae white, black at base and usually with a narrow blackish crescent at apex above; trochanters, femora, and tibiae fulvous; front and middle tarsi fulvous, the last 2 or 3 segments brown; first three segments of hind tarsus white, the basal 0.4± of the first segment fulvous; last two segments of hind tarsus blackish.

Specimens (142♂, 59♀): From Florida (Archbold Biological Station in Highlands Co., Biscayne Bay, Fort Ogden, Gainesville, Highlands Hammock State Park, Key Largo, Indian River, Larkins in Dade Co., Miami Beach, Newman's Lake at Gainesville, Ocala, Okeechobee, Orlando, Palm Beach, Paradise Key in Everglades National Park, Tallahassee, Tarpon Springs, and Torreya State Park); Georgia (Pine Mountain in Rabun Co. at 1,400 ft.); Illinois; Kansas (Lawrence and Rock Creek in Douglas Co.); Louisiana (Opelousas); Maryland (Takoma Park); Michigan (Ann Arbor and Oakland Co.); Minnesota; Missouri (Willard); New Hampshire (Durham); New Jersey (Moorestown); New York (Farmingdale and Nyack); North Carolina (Kill Devil Hills, Long Beach, Murfreesboro, New River, Raleigh, and Southern Pines); Ohio (Bedford, Brecksville, and Puritas Springs in Cuyahoga Co.); Pennsylvania (Jeannette); South Carolina (Florence and McClellanville); Tennessee (Knoxville); Texas (Brownsville, College Station, Jacksonville, Liberty, Plano, and Victoria); Virginia (Arlington); West Virginia (French Creek); and Wisconsin (Milwaukee).

Collection dates are from mid-spring to mid-fall. All Florida specimens were collected in March and April. Unusually early and late dates of collection from other states are: March 18 at Liberty, Tex.; April 4 at College Station, Tex.; April 14 and 20 in Wake Co., N.C.; October 22 at Arlington, Va.; October 31 and November 8 at Southern Pines, N.C.; and December 12 at Liberty, Tex.

Reared specimens are as follows: ♂, from *Coccoloba uvifera*, (Polygonaceae), Miami Beach, Fla., Apr. 27, 1918, T. E. Snyder. ♀, from *Podosesia syringae*, Gainesville, Fla., Mar. 15, 1929, G. P. Engelhardt. ♀, from *Psyrassa unicolor*, French Creek, W. Va.,

F. E. Brooks. ♀, from *Wissadula lozani* (Malvaceae), Brownsville, Tex., May 5, 1919, Diven.

The typical habitat of the species is thickets of deciduous trees, shrubs, and vines with some amount of dead wood. The males are very active fliers. The females are seen flying, on foliage, or crawling along branches in the interior of a bush or thicket.

This species is found in the Carolinian, Austroriparian, and Tropical faunas, increasing in abundance southward. The usual habitat is thickets.

4. Genus Cryptohelcostizus

Figure 325,b

Cryptohelcostizus Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 534. Type: (*Cryptohelcostizus rufigaster* Cushman) = *alamedensis* (Ashmead); original designation.

Front wing 5.3 to 11.0 mm. long; clypeus rather small, short, convex except that it is flattened or a little concave near apex, broadly truncate, without a median tooth; sternaulus absent; pleural carina absent; basal carina of propodeum complete, evenly arcuate or angled forward a little at center; apical carina of propodeum absent; areolet very large, pentagonal; nervulus basad of basal vein by about 0.5 its length; nervellus broken a little below the middle; first abdominal segment without a subbasal lateral tooth and without median dorsal carinae, its spiracle at or a little basad of its midlength; ovipositor sheath 0.50 to 0.78 as long as front wing; ridges on ovipositor tip rather distant.

The genus *Cryptohelcostizus* is entirely Nearctic. There is one species in southeastern United States and a number in the Southwest, of which one ranges northward to British Columbia. Specimens are scarce in collections and the account below suffers from lack of material.

The species are parasitic on borers in branches or twigs of trees and shrubs, in arid or semiarid places. Buprestidae are the usual hosts.

Key to the species of Cryptohelcostizus

1. Wings black or strongly infuscate; areolet large, about 0.78 as high as radial cell 2
   Wings hyaline to moderately infuscate; areolet rather small, about 0.6 as high as radial cell 5
2. Hairs on front face of hind femur moderately dense, their sockets separated by about 0.7 the length of the hairs; punctures on mesopleurum separated by about 0.7 their diameter . . . . **1. dichrous** Viereck
   Hairs on front face of hind femur sparse, their sockets separated by about 2.0 the length of the hairs; punctures on mesopleurum separated by about 0.4 their diameter 3
3. Hind margin of temple, and its occipital carina, strongly bulged outward at level of lower corner of eye; femora ferruginous. . **3. genalis,** new species

Hind margin of temple, and its occipital carina, not or only faintly bulged outward at level of lower corner of eye; femora black 4

4. Temple very weakly convex; second abscissa of discocubital about 1.4 as long as third abscissa; clypeus and upper margin of pronotum entirely black.
2. **leiomerus,** new species

Temple moderately convex; second abscissa of discocubital about 1.15 as long as third abscissa; clypeus and upper margin of pronotum marked with white.
4. **fumipennis,** new species

5. Propodeum and hind coxa entirely black 6

Propodeum and hind coxa marked with white 8

6. Hairs on front side of hind femur not very sparse, their sockets separated by about 0.7 the length of the hairs in male, by about 1.0 the length of the hairs in female . . . . 5. **chrysobothridis** Cushman

Hairs on front side of hind femur sparse, their sockets separated by about 1.0 to 1.5 the length of the hairs in male, by about 1.5 to 2.5 the length of the hairs in female 7

7. Femora black or blackish; first abdominal segment black with its apical 0.25± ferruginous . . . . 6. **nigricans,** new species

Femora ferruginous; first abdominal segment ferruginous, sometimes infuscate basally . . . . 7. **alamedensis** (Ashmead)

8. Mesopleurum and metapleurum each with a large white spot (fig. 338,g); hairs on front side of hind tibia rather sparse, their sockets separated by about 0.7 their length. . . . . 10. **maculosus,** new species

Mesopleurum and metapleurum entirely black except for a white mark on subtegular ridge; hairs on front side of hind tibia rather dense, their sockets separated by about 0.3 their length 9

9. Hairs on front side of hind femur rather close, their sockets separated by about 0.75 the length of the hairs; ovipositor sheath about 0.75 as long as front wing . . . . 8. **caudatus,** new species

Hairs on front side of hind femur sparse, their sockets separated by about 3.0 the length of the hairs; ovipositor sheath about 0.40 as long as front wing.
9. **ornatus** Cushman

1. Cryptohelcostizus dichrous Viereck

Cryptohelcostizus dichrous Viereck, 1921, Psyche, vol. 28, p. 73; ♂, ♀. Type: ♀, Southern Pines, N. C. (Cambridge).

Front wing of male 8.3 to 10.5 mm. long, of female 7.5 to 12.4 mm. long; temple almost flat, with sparse hairs all over; punctures on mesopleurum separated by about 0.7 their diameter; prepectal carina usually distinct above, usually reaching subtegular ridge (obsolescent or obsolete above and not reaching subtegular ridge in other species of the genus); hairs on front face of hind femur moderately dense, their sockets separated by about 0.7 the length of the hairs; areolet large, about 0.78 as high as radial cell, about 1.1 as long as high; second abscissa of discocubital about 1.2 as long as third abscissa of discocubital; punctures on second tergite separated by about 1.2 their diameter; ovipositor sheath about 0.35 as long as front wing.

Black. Narrow frontal orbit, often narrow facial orbit, and narrow hind orbit, whitish; hind femur of male ferruginous, its base and apex narrowly infuscate; wings black; abdomen ferruginous.

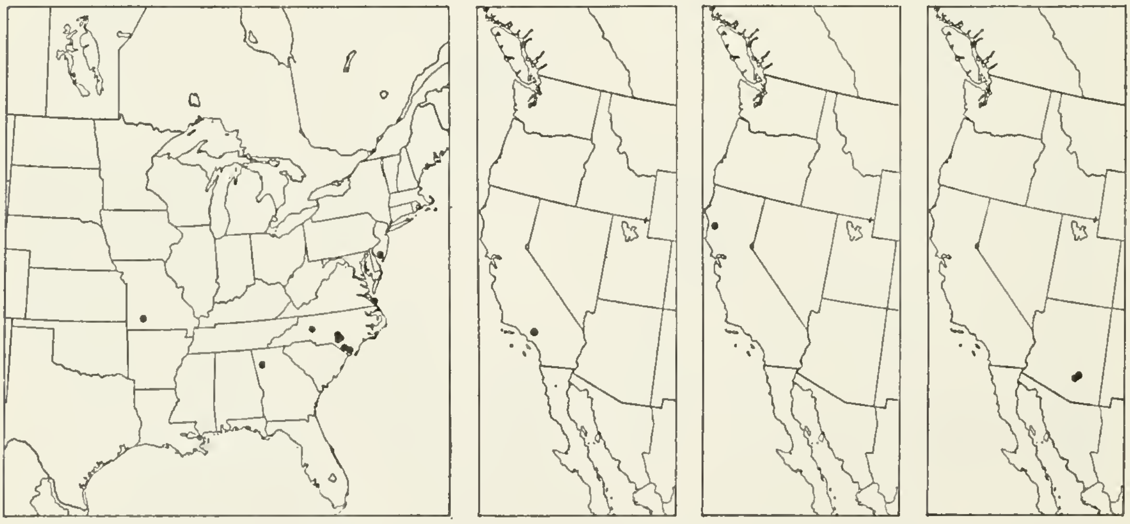
Specimens: ♀, Dallas, Ga., Dec. 9, 1945, P. W. Fattig (Washington). ♀, Willard, Mo., March 15, A. E. Brower (Ithaca). 2♀, Manumuskin, N.J., Apr. 22, 1901, and Oct. 21, 1901 (Washington). ♀, Aberdeen, N.C., Apr. 9, 1926, M. H. Davis (Raleigh). ♂, Conover, N.C., Oct. 8, 1919, J. E. Eckert (Washington). ♀, Council, N.C., May 16, 1940, D. L. Wray (Townes). ♀, Lumberton, N.C., Oct. 27, 1949, Rabb and Townes (Townes). ♀, Page Lake, N.C., Oct. 27, 1949, Rabb and Townes (Townes). ♀, Southern Pines, N.C., October 1955, H. Townes (Townes). ♂, ♀, Texas (St. Paul). ♀, Virginia Beach, Va., October 18, Jones, Walker, and Brannon (Washington). ♂, Belfrage collection (Washington).

This species is found in the Austroriparian fauna. Adults have been collected in the spring and fall. In our experience, they fly among grasses and interspersed bushes in scrub oak and pine savanna country.

2. Cryptohelcostizus leiomerus, new species

Female type: Front wing 11 mm. long; temple almost flat, with almost no hairs on its front half, with rather sparse hairs on its hind half; punctures on mesopleurum separated by about 0.4 their diameter; hairs on front face of hind femur sparse, their sockets separated by about 2.0 the length of the hairs; areolet large, 0.74 as high as radial cell, 1.1 as long as high; second abscissa of discocubital 1.4 as long as third abscissa; punctures on second tergite separated by about 1.3 their diameter; ovipositor sheath 0.43 as long as front wing.

Black. Very narrow frontal and facial orbits, narrow hind orbit, and transverse mark on clypeus, whitish; front tibia reddish brown below; wings black; abdomen ferruginous. The flagellum of the type



Figures 289–292.—Localities: 289 (left), *Cryptohelcostizus dichrous;* 290 (center, left), *C. leiomerus;* 291 (center, right), *C. genalis;* 292 (right), *C. fumipennis.*

is lacking, so the presence or absence of a white band on flagellum cannot be determined.

Type: ♀, Tanbark Flat, Los Angeles Co., Calif., June 24, 1952, W. V. Garner (Berkeley).

3. Cryptohelcostizus genalis, new species

Male: Unknown.

Female type: Front wing 9.4 mm. long; temple almost flat, at level of lower corner of eye somewhat widened, posteriorly bulged, and margined by the occipital carina which in that area is curved outward and very strong; temple above rather coarsely punctured its full width, towards its midheight the coarse punctures restricted to its hind edge, elsewhere impunctate or with only small, sparse punctures; punctures on mesopleurum separated by about 0.2 their diameter; hairs on front face of hind femur sparse, their sockets separated mostly by about 2.0 the length of the hairs; areolet large, 0.87 as high as radial cell, 0.95 as long as high; second abscissa of discocubital 1.1 as long as third abscissa; punctures on second tergite separated by about 1.0 their diameter; ovipositor sheath 0.40 as long as front wing.

Black. Orbit narrowly whitish in front and behind; small submedian spot on collar and small spot on upper end of epomia whitish; femora ferruginous, the front femur infuscate above; front and middle tibiae infuscate, reddish brown below; hind tibia tinged with reddish brown basally below; wings strongly infuscate; abdomen ferruginous.

Type: ♀, Capella, Mendocino Co., Calif., May 20, 1955, E. I. Schlinger (Davis).

4. Cryptoheleostizus fumipennis, new species

Male: Unknown.

Female: Front wing 8.8 to 9.3 mm. long; temple moderately convex, its hind half with moderately small, moderately sparse punctures, its front half almost impunctate; punctures on mesopleurum separated by about 0.15 their diameter; hairs on front face of hind femur sparse, their sockets separated by about 2.0 the length of the hairs; areolet large, 0.72 as high as radial cell, 1.0 as long as high; second abscissa of discocubital 1.1 as long as third abscissa; punctures on second tergite separated by about 0.9 their diameter; ovipositor sheath 0.45 as long as front wing.

Black. Front and hind orbits, part of cheek, clypeus except marginally, sometimes small spot near base of mandible, collar, upper margin of pronotum, spot on base of tegula, postscutellum, and sometimes apex of scutellum, white; labrum brown, paler centrally; palpi fuscous; front leg, middle leg beyond trochanters, and hind femur piceus; wings strongly infuscate; abdomen ferruginous.

Type: ♀, "resting on blossom," Sabino Canyon, Ariz., Nov. 24, 1917, W. D. Edmonston (Washington, USNM 63839).

Paratype: ♀, Tucson, Ariz., Sept. 1, 1940, Bryant (San Francisco).

5. Cryptohelcostizus chrysobothridis Cushman

Cryptohelcostizus chrysobothridis Cushman, 1940, Proc. U.S. Nat. Mus., vol. 88, p. 358; ♂, ♀. Type: ♀, Stillwater, Okla. (Washington).

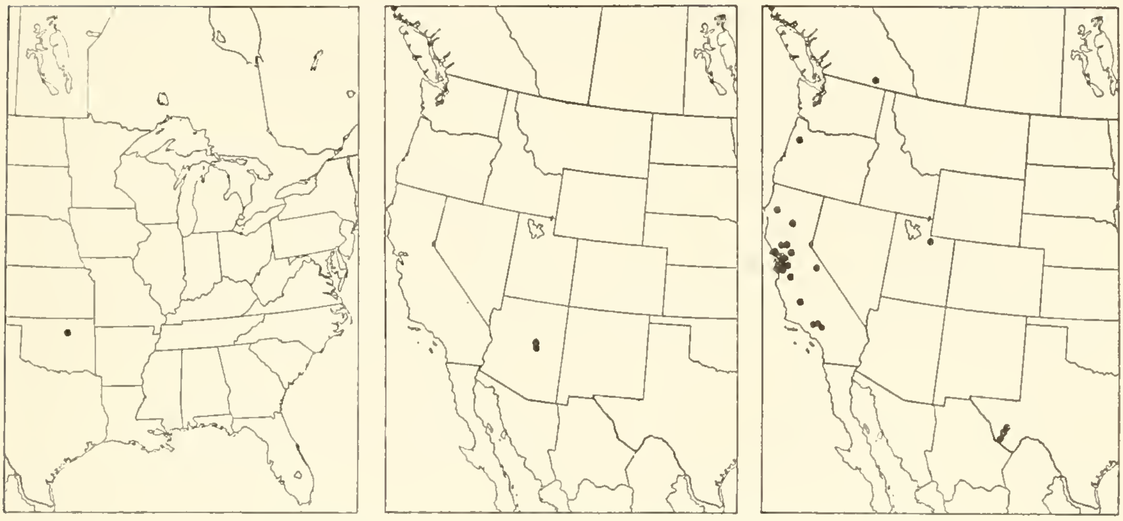
Front wing of male 6.4 to 8.3 mm. long, of female 7.2 to 8.0 mm. long; temple moderately convex, its hind 0.3± with moderately close small punctures, the rest almost impunctate; punctures on mesopleurum separated by about 0.25 their diameter; hairs on front face of hind femur not very sparse, their sockets separated by about 0.7 the length of the hairs in male, by about 1.0 the length of the hairs in female; areolet rather small, about 0.5 as high as radial cell, about 1.0 as long as high; second abscissa of discocubital about 1.35 as long as third abscissa; punctures on second tergite separated by about 0.8 their diameter; ovipositor sheath about 0.45 as long as front wing.

Black. Very narrow frontal, facial, and hind orbits, central part of clypeus, usually spot near base of mandible, usually stripe on upper margin of pronotum, usually base of tegula, and third and fourth segments of male middle and hind tarsi, white; labrum brown; female flagellum with an incomplete white band that covers about two segments; third and fourth segments of hind tarsus of female, and sometimes of middle tarsus of female, pale brown or whitish; front and middle legs beyond trochanters and hind femur blackish brown; wings faintly infuscate; abdomen ferruginous, the basal 0.4± of its first segment infuscate.

Specimens: 4♂, 4♀ (paratypes), Stillwater, Okla., Mar. 16, 29, and 30, 1936, and Apr. 4, 6, and 7, 1936, Myron Maxwell (Washington and Townes). ♂, Stillwater, Okla., Aug. 2, 1937, C. W. Eddy (St. Paul).

6. Cryptohelcostizus nigricans, new species

Front wing of male 5.8 to 8.0 mm. long, of female 7.7 to 8.0 mm. long; temple moderately convex, its hind 0.3± with moderately sparse, small punctures, the rest almost impunctate; punctures on mesopleurum separated by about 0.25 their diameter; hairs on front face of hind femur moderately sparse in male, very sparse in female, their sockets separated by about 1.5 the length of the hairs in male, by about 2.5 the length of the hairs in female; areolet rather small, about 0.52 as high as radial cell, about 0.9 as long as high; second abscissa of discocubital about 1.07 as long as third abscissa; punctures on second tergite separated by about 1.3 their diameter; ovipositor sheath about 0.45 as long as front wing.



Figures 293–295.—Localities: 293 (left), *Cryptohelcostizus chrysobothridis;* 294 (center), *C. nigricans;* 295 (right), *C. alamadensis.*

Black. Very narrow and somewhat interrupted front and hind orbits, median part of clypeus, sometimes spot near base of mandible, two median flagellar segments of female except below, narrow stripe of variable length on upper margin of pronotum, sometimes small spot on base of tegula, spot on under side of first front trochanter of male, third and fourth segments of hind tarsus of male, and apical 0.3 of second segment of hind tarsus of male, white; labrum brown; front legs beyond trochanters piceous; third segment of hind tarsus of female brown; wings of male subhyaline, of female moderately infuscate; abdomen ferruginous, the basal 0.82 of the first segment black.

Type: ♀, Parker Creek, Sierra Ancha, Ariz., May 7, 1947, H. and M. Townes (Washington, USNM 63840).

Paratypes: ♂, Parker Creek, Sierra Ancha, Ariz., Apr. 24, 1947, H. and M. Townes (Townes). ♂, ♀, Workman Creek, Sierra Ancha, Ariz., Apr. 28, 1947, H. and M. Townes (Townes).

7. Cryptohelcostizus alamedensis (Ashmead)

Cryptus alamedensis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 409; ♀. Type: ♀, Alameda, Calif. (Washington).

Cryptohelcostizus rufigaster Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 534; ♂, ♀. Type: ♀, Harold, Calif. (Washington).

Front wing of male 5.3 to 7.8 mm. long, of female 5.3 to 9.8 mm. long; temple moderately convex, with very small punctures, on its hind half the punctures rather sparse, elsewhere very sparse or absent; punctures on mesopleurum separated by about 0.2 their diameter; hairs on front face of hind femur moderately sparse in male, very sparse in female, their sockets separated by about 1.0 the length of the hairs in male, by about 2.0 the length of the hairs in female;

areolet approximately as in *C. chrysobothridis;* punctures on second tergite separated by about 1.2 their diameter; ovipositor sheath about 0.65 as long as front wing.

Black. Narrow front and hind orbits, clypeus except marginally, labrum of male, spot near base of mandible, upper side of one to two of the median flagellar segments of female, sometimes submedian spot on collar, narrow stripe of variable extent on upper margin of pronotum, sometimes spot on subtegular ridge, base of tegula, postscutellum, and under side of first front trochanter of male and often also of female, white; labrum of female light brown; apex of first trochanters and most or all of second trochanters ferruginous; femora ferruginous; legs beyond femora dusky ferruginous, the last segment of all tarsi fuscous, third and fourth segments of male hind tarsus white, and third segment of female hind tarsus stramineous; wings of male hyaline, of female weakly infuscate; abdomen ferruginous.

Specimens: ♀, Robson, B.C., June 19, 1940, H. R. Foxlee (St. Paul). ♀, Berkeley, Calif., Apr. 30, 1957, R. P. Allen (Berkeley). ♂, reared from *Myrmex arizonicus*, Cajon Canyon, Calif., April 1937 (Washington). ♂, reared from *Myrmex arizonicus* in mistletoe, Cajon Pass, San Bernardino Co., Calif., May 10, 1931 (Washington). 2♀, reared from *Cupressus*, Carson Ridge, Marin Co., Calif., Jan. 1, 1957, and Mar. 8, 1957, A. Chemsak (Berkeley). ♀, reared from buprestid borer in *Malus*, Chico, Calif., Feb. 15, 1912, J. R. Horton (Washington). ♀, Elk Grove, Calif., Sept. 24, 1948, H. A. Hunt (Townes). ♂, Firebaugh, Calif., Apr. 22, 1948, Ray F. Smith (Berkeley). ♀, reared from *Chrysobothris mali*, Harold, Calif., Apr. 2, 1894, A. B. Eells (Washington). ♂, Isabel Creek on Mount Hamilton, Calif., May 1, 1956, D. J. Burdick (Berkeley). ♂, reared from *Agrilus angelicus*, Laurel, Calif., May 5, 1917, H. E. Burke (Washington). 4♂, Leevining, Calif., June 22, 1948, H., M., G., and D. Townes (Townes). ♂, ♀, reared from *Chrysobothris mali*, Los Gatos, Calif., May 23, 1918, R. D. Hartman (Townes and Washington). ♂, reared from "*Eriobotrya,*" Los Gatos, Calif., Oct. 29, 1918, H. E. Burke (Washington). ♂, Oakland Hills, Alameda Co., Calif., Apr. 8, 1940, W. F. Barr (Berkeley). ♂, Rumsey, Calif., Apr. 11, 1947, C. G. Moore (Davis). ♂, Shafter, Calif., May 25, 1937, G. L. Smith (Washington). ♂, reared from *Chrysobothris mali*, Simla Station, Calif., June 28, 1922, R. D. Hartman (Washington). ♀, reared from *Chrysobothris mali*, Stanford University, Calif., May 15, 1922, H. E. Burke (Washington). ♂, 2♀, Stanford University, Calif., Mar. 10 and 17, 1947 (Washington). ♀, Trinity Co., Calif., May 20, 1934, A. T. Cole (Davis). ♀, Walter Square, Napa Co., Calif., May 26, 1951, E. I. Schlinger (Townes). ♀, Corvallis, Oreg., April (Washington). ♂, reared from stems of *Agave*, near Marfa, Tex., Feb. 26, 1953, J. Russell (Washington). ♂, between Marfa and Presidio, Tex., December 1951 to January 1952, J. H. Russell and wife (Washington). ♀, reared from borer in *Agave* stem, Presidio, Tex., Mar. 7, 1951, J. H. Russell and wife (Washington). ♀, Strawberry Daniel Pass, Utah, June 19, 1948, H., M., G., and D. Townes (Townes).

This species ranges from British Columbia to southern California and western Texas. It has been reared from coleopterous borers in desert and semidesert trees and shrubs.

8. Cryptohelcostizus caudatus, new species

Male: Unknown.

Female type: Front wing 10.0 mm. long; temple weakly convex, dorsally, ventrally, and posteriorly with scattered small, rather weak punctures, the rest almost impunctate; punctures on mesopleurum crowded; hairs on front face of hind femur moderately dense, their sockets separated by about 0.75 the length of the hairs; areolet 0.54 as high as radial cell, 1.07 as long as high; second abscissa of discocubital the same length as third abscissa; punctures on second tergite separated by about 0.8 their diameter; ovipositor sheath 0.75 as long as front wing.

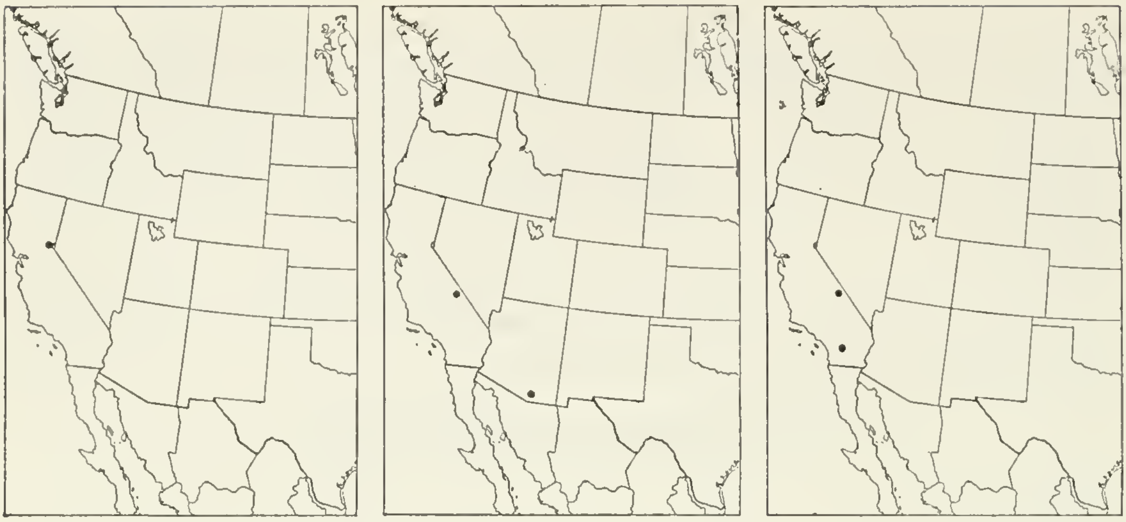
Black. Moderately wide front and hind orbits, most of cheek, clypeus except marginally, labrum, base of mandible, markings on palpi, incomplete band covering 2.5 flagellar segments, collar, upper margin of pronotum, subtegular ridge, tegula except for its brown apex, postscutellum, a pair of confluent spots on scutellum, sublateral apical spot on propodeum, front coxa in front and at apex, apical marks on middle coxa, median dorsal spot on hind coxa, and underside of first trochanter of front and middle legs, white; second trochanters fuscoferruginous; femora ferruginous, the front femur weakly infuscate above; tibiae ferruginous, darkened above; front and middle tarsi brownish ferruginous, their fifth segments brown; hind tarsus fuscous, the second, third, and base of fourth segments whitish; wings faintly infuscate; abdomen ferruginous, the basal 0.4 of first segment infuscate.

Type: ♀, Lake Tahoe, Calif., Aug. 15, 1950, R. M. Bohart (Davis).

9. Cryptohelcostizus ornatus Cushman

Cryptohelcostizus ornatus Cushman, 1940, Proc. U.S. Nat. Mus., vol. 88, p. 359; ♀. Type: ♀, Death Valley, Calif. (Washington).

Front wing of male 7.2 mm. long, of female 7.5 mm. long; temple moderately convex, its hind half with fine, moderately sparse punctures, the rest almost impunctate; punctures on mesopleurum separated by about 0.3 their diameter; hairs on front face of hind femur sparse, their sockets separated by about 3 times the length of the



FIGURES 296–298.—Localities: 296 (left), *Cryptohelcostizus caudatus;* 297 (center), *C. ornatus;* 298 (right), *C. maculosus.*

hairs; areolet about 0.65 as high as the radial cell, about 1.1 as long as high; second abscissa of discocubital about 1.5 as long as third abscissa; punctures on second tergite separated by about 0.8 their diameter; ovipositor sheath 0.40 as long as front wing.

Black. Broad orbit (with a narrow interruption at top and bottom of eye), clypeus except lateral and apical margins, often spot on mandible, incomplete white band on female flagellum that covers 1.5 to 3 segments, collar, stripe on upper margin of pronotum, sometimes stripe on lower margin of pronotum, tegula, subtegular ridge, apex of scutellum, postscutellum, small median spot on propodeum of female, and moderately large apical sublateral spot on propodeum, white; front side of front coxa and outer side of front and middle coxae of female, white, both female coxae with a vertical fuscous stripe on outer side that divides the white; front and middle first trochanters of female white, brown above; front and middle legs beyond first trochanters ferruginous; hind coxa with a large white spot above; hind femur fuscoferruginous in male, ferruginous in female; hind tibia fuscous in male, ferruginous in female; hind tarsus brown, in female its third and fourth segments whitish; wings hyaline; abdomen ferruginous, the first segment with all but the apical 0.25 black.

Specimens: ♂, Sahuarito, Ariz., Apr. 11, 1947, H. and M. Townes (Townes). ♀ (type), reared from *Chrysobothris deserta* in desert holly, Death Valley, Calif., Feb. 23, 1939, M. F. Gilman (Washington).

10. Cryptohelcostizus maculosus, new species

FIGURE 338,g

Male: Unknown.

Female: Front wing 7.4 to 9.2 mm. long; temple rather convex, its hind 0.4± with weak, rather sparse punctures, the rest impunctate;

punctures on mesopleurum separated by about 0.2 their diameter; hairs on front face of hind femur sparse, their sockets separated by about 2.0 the length of the hairs; hairs on hind tibia exceptionally sparse and coarse, the sockets of those on its front side separated by about 0.7 the length of the hairs (in all other species the sockets separated by about 0.3 the length of the hairs); areolet about 0.5 as high as radial cell, about 0.78 as long as high; second abscissa of discocubital about same length as third abscissa; punctures on second tergite separated by about their diameter; ovipositor sheath about 0.50 as long as front wing.

Black. Head, thorax, and hind coxa marked with white as in figure 338,g; face entirely white or sometimes (in paratype) black medially; flagellum with a white band covering about 3 segments; labrum, base of mandible, markings on palpi, sometimes (in type) elongate median mark on mesoscutum, sometimes (in type) lateral margin of median and lateral lobes of mesoscutum and front end of median margin of lateral lobe, outer side of front and middle coxae, and under side of front and middle first trochanters, white; second trochanter dusky ferruginous; legs beyond trochanters fulvous, the second through fourth segments of hind tarsus partly whitish; wings hyaline; abdomen fulvous, the first segment infuscate basally and apex of its tergite narrowly whitish.

Type: ♀, reared from *Prosopis*, material collected Apr. 25, 1957, adult emerged Sept. 3, 1957, Death Valley, Calif., R. C. Hall (Washington, USNM 63841).

Paratypes: ♀, Indio, Calif., Sept. 21, 1948 (Berkeley). This specimen also bears a label "Indio area, Apr. 25, 1949." Possibly Sept. 21, 1948, was the collecting date of material to be reared and Apr. 25, 1949, the date of adult emergence.

5. Genus Helcostizus

FIGURE 326,a

Brachycentrus Taschenberg, 1865, Zeitschr. Ges. Naturwiss. Halle, vol. 25, p. 106. Name preoccupied by Curtis, 1834. Type: (*Brachycentrus pimplarius* Taschenberg) = *albator* (Thunberg); monobasic.

Helcostizus Foerster, 1868, Verh. Naturh. Ver. Rheinlande, vol. 25, p. 186. Type: (*Cryptus brachycentrus* Gravenhorst) = *albator* (Thunberg); designated by Viereck, 1914.

Cyrtocryptus Marshall, 1872, A catalogue of British Hymenoptera, vol. 3, p. 41. Type: (*Cryptus brachycentrus* Gravenhorst) = *albator* (Thunberg); monobasic.

Mesocryptus Thomson, 1873, Opuscula entomologica, fasc. 5, p. 519. Type: (*Cryptus brachycentrus* Gravenhorst) = *albator* (Thunberg); monobasic.

Heterocryptus Woldstedt, 1873, Bidr. Finland Naturkänn, vol. 21, p. 73. Type: (*Cryptus brachycentrus* Gravenhorst) = *albator* (Thunberg); designated by Viereck, 1914.

Asternaulax Viereck, 1912, Proc. U.S. Nat. Mus., vol. 42, p. 632. Type: (*Asternaulax fiskei* Viereck) = *albator canadensis* (Provancher); original designation.

Chenbergus Navas, 1930, Bol. Soc. Ent. España, vol. 13, p. 43. New name for *Brachycentrus*.

Front wing 3.5 to 7.2 mm. long; clypeus small, short, its basal 0.6± very weakly convex, the apical 0.4± flat or very weakly concave, the apical margin broadly truncate, with a small median tooth; sternaulus absent or faint; pleural carina present or absent; basal carina of propodeum near midlength of propodeum, angled forward toward midline to make a broad, inverted V; apical carina of propodeum present but rather weak in *H. annulicornis*, absent in all other species; areolet very small, often open; nervulus distad of basal vein by about 0.3 its length; nervellus broken below the middle; first abdominal segment very short and stout, without a subbasal lateral tooth, the median dorsal carinae very weak except in *H. annulicornis;* spiracle of first tergite a little in front of the middle; ovipositor 0.50 to 0.78 as long as front wing, the tip of upper valve enclosed by lower valves not at all or only along its lower edge, the teeth on ovipositor tip moderately distant.

Helcostizus is a small genus. The distribution is Holarctic. There are five Nearctic species, of which one occurs also in Eurasia as a distinct subspecies. Specimens are rare in collections. The treatment below suffers from lack of material, and must be considered tentative. The species are parasitic on coleopterous borers in small branches.

Key to the Nearctic species of Helcostizus

1. Propodeum with both basal and apical transverse carinae present, the apical carina either complete or interrupted medially; median longitudinal carinae of first tergite moderately sharp on basal 0.6± and traceable to apex of the tergite; basal tooth of ovipositor tip vertical . . **1. annulicornis** (Walsh)
   Propodeum with only the basal transverse carina (but this carina further apicad than its usual position); median longitudinal carinae of first tergite very blunt, usually not traceable beyond midlength of the tergite; basal tooth of ovipositor tip slanted at a 45° angle 2
2. Hind tibia white, with an apical and a subbasal fuscous band; propodeum about 1.1 as long as wide . . . . **2. tibialis,** new species
   Hind tibia medium brown to black, often with a basal whitish band; propodeum about 0.75 to 0.95 as long as wide 3
3. Upper half of mesopleurum polished or subpolished; ovipositor about 0.78 as long as front wing . . . . **3. subrectus,** new species
   Upper half of mesopleurum rather strongly mat except that speculum (upper hind part of mesopleurum) is polished 4
4. Ninth tergite of female elongate, in dorsal view about 1.4 as long as wide; ovipositor about 0.74 as long as front wing. Male unknown.
   4. oxyura, new species
   Ninth tergite of female of normal length, in dorsal view about 0.9 as long as wide; ovipositor about 0.57 as long as front wing . **5. albator** (Thunberg)

1. Helcostizus annulicornis (Walsh)

Echthrus annulicornis Walsh, 1873, Trans. Acad. Sci. St. Louis, vol. 3, p. 159; ♀. Type: ♀, Illinois? (destroyed in Chicago fire of 1871).

Helcostizus bicarinatus Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55, p. 532; ♀. New synonymy. Type: ♀, Falls Church, Va. (Washington).

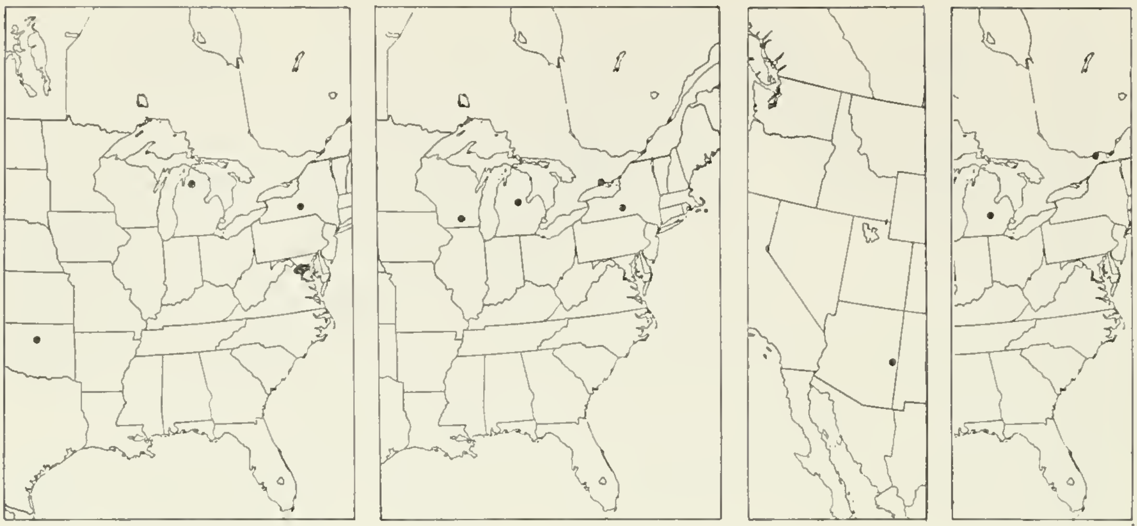
Front wing of male 4.0 to 6.0 mm. long, of female 5.8 to 8.5 mm. long; tyloids on male flagellum in form of low, rounded, obliquely longitudinal ridges on about 4 segments; body of medium build; propodeum about 0.90 as long as wide, its apical half rather steeply sloping; ninth tergite of female, as seen from above, about 1.3 as long as wide; ovipositor about 0.55 as long as front wing.

The above structural characters are those by which most species of *Helcostizus* differ among themselves. In addition, this species differs from all the rest as follows: Areolet receiving second recurrent vein beyond the middle (at or near the middle in other species); apical transverse carina of propodeum complete or narrowly interrupted medially (the carina absent in other species); median longitudinal carina of first tergite rather strong and moderately sharp on its basal half, traceable to apex of tergite but fading apically (these carinae low and indistinct in other species, usually not traceable to apex of tergite); all teeth of ovipositor tip vertical (in other species the basal tooth slanted at about 45°, the next two less strongly slanted, and the rest vertical).

Male: Black. Face partly or entirely, clypeus, stripe on front of scape, labrum, spot on base of mandible, more or less of palpi, extreme hind corner of pronotum, tegula, and front coxa and trochanters, white; mandible and palpi largely stramineous or brown; front leg beyond trochanters fulvous, the fifth tarsal segment fuscous; middle coxa, femur, and tibia fulvous, the tibia with a broad basal whitish band; middle trochanters whitish, tinged with fulvous; middle tarsus fulvous, infuscate apically, the basitarsus with a whitish band at base; hind coxa, trochanters, and femur fulvous, the apical 0.3± of femur infuscate; hind tibia black, its basal 0.25 white; hind tarsus black, the basitarsus white on its basal 0.3.

Female: Black. Labrum stramineous; mandible reddish brown; palpi fuscous; flagellum with a white band covering about 3 segments, the band incomplete below; tegula and extreme hind corner of pronotum white; front coxa and front and middle trochanters fulvous. Legs colored otherwise as in male.

Specimens: ♂, Takoma Park, Md., Oct. 7, 1945, H. and M. Townes (Townes). ♀, Patuxent Refuge, Bowie, Md., May 1, 1948, R. M. Mitchell (Mitchell). ♀, Kalkaska Co., Mich., June 11, 1955, R. R. Dreisbach (Dreisbach). ♂, Ithaca, N.Y., May 28, 1947, W. Mason



Figures 299–302.—Localities: 299 (left), *Helcostizus annulicornis;* 300 (center, left), *H. tibialis;* 301 (center, right), *H. subrectus;* 302 (right), *H. oxyura.*

(Ottawa). ♂, Ithaca, N.Y., F. H. Chittenden (Washington). ♀, Stillwater, Okla., Apr. 16, 1936, M. Maxwell (Ottawa). ♀, reared (host probably *Elaphidion parallelum*), Barcroft, Va., Mar. 9, 1935, J. C. Bridwell (Washington).

This species occurs in the Transition and Carolinian faunas.

2. Helcostizus tibialis, new species

Front wing of male 4.7 mm. long, of female 5.5 to 6.0 mm. long; flagellum of single male specimen missing, so tyloids cannot be described; body slender; propodeum about 1.1 as long as wide, in profile evenly convex, its apical part a little less abruptly sloping than in other species; ninth tergite of female, as seen from above, about 1.4 as long as wide; ovipositor about 0.59 as long as front wing.

Male: Black. Face, cheek, lower part of temple, mouth parts, front half of scape and pedicel, propleurum except for front end, broad stripe on lower margin of pronotum, small triangle in hind corner of pronotum, small stripe on subtegular ridge, mesosternum and adjacent part of mesopleurum, tegula, front and middle coxae, and trochanters, white, the upper side of first hind trochanter fuscous; front femur and tibia fulvous; front tarsus brown, darkest apically; hind coxa fulvous, its extreme apex whitish; hind femur fulvous, its apical fourth infuscate except that extreme apex is whitish; hind tibia whitish, with a subbasal infuscate band and its apical third fuscous; hind tarsus fuscous, the basal 0.25 of its basitarsus whitish; middle legs beyond trochanters repeating markings of hind legs but in paler shades and with less contrast.

Female: Black. Labrum, band on flagellum covering about 2.5 segments but incomplete below, extreme hind corner of pronotum, tegula, front trochanters, and apex of front coxa, white; mandible reddish brown; palpi largely light brown, often partly white; front legs beyond trochanters fulvous, the front side of front tibia stramineous and last segment of tarsus fuscous; hind coxa fulvous; hind first trochanter fulvous with whitish tinges, fuscous above; hind second trochanter whitish; hind femur fulvous, its apical 0.25 infuscate except that extreme apex is whitish; hind tibia whitish, its apical 0.25 and a broad subbasal band fuscous; hind tarsus fuscous, the basal 0.4± of basitarsus white; middle leg repeating color pattern of hind legs but with paler shades and less contrast.

Type: ♀, Midland Co., Mich., Sept. 9, 1934, R. R. Dreisbach (Washington, USNM 63842).

Paratypes: ♂, Ithaca, N.Y., Sept. 19, 1936, H. Townes (Townes). ♀, Ithaca, N.Y., Oct. 23, 1936 (Ithaca). ♀, Trenton, Ont., Oct. 14, 1906, Evans (Ottawa). ♀, Madison, Wis., Sept. 4, 1951, L. K. Smith (Madison).

This species occurs in the Alleghanian fauna. It has been collected only in the fall.

3. Helcostizus subrectus, new species

Male: Unknown.

Female type: Front wing 7.0 mm. long; body rather slender; thorax less strongly mat than in other species, the upper half of mesopleurum polished or subpolished (mostly mat in other species), and punctures on mesoscutum distinct (indistinct in other species); propodeum 0.89 as long as wide, evenly convex; ninth tergite, as seen from above, 1.25 as long as wide; ovipositor 0.78 as long as front wing.

Black. Labrum light brown; mandible with reddish brown tinge; palpi dark brown; flagellum entirely black; extreme hind corner of pronotum whitish; basal half of tegula white, the rest light brown; legs fulvoferruginous, the front and middle tarsi brownish apically with their last segment dark brown, apical 0.15 of hind femur moderately infuscate, and hind tibia and tarsus fuscous.

Type: ♀, near Alpine, Ariz., May 24, 1947, H. and M. Townes (Washington, USNM 63843).

4. Helcostizus oxyura, new species

Male: Unknown.

Female: Front wing 6.7 to 7.2 mm. long; body build medium; propodeum about 0.80 as long as wide, its apical third rather flat and strongly sloping; ninth tergite, as seen from above, about 1.4 as long as wide; ovipositor about 0.74 as long as front wing.

Colored like the female of *H. albator canadensis*.

Type: ♀, Cumberland, Ont., Sept. 20, 1939 (Ottawa).

Paratype: ♀, East Lansing, Mich., Oct. 2, 1893 (East Lansing).

5. Helcostizus albator (Thunberg)

Front wing of male 3.5 to 6.4 mm. long, of female 5.0 to 8.5 mm. long; body stout; propodeum about 0.83 as long as wide, its apical 0.4 somewhat flattened and more steeply declivous; ninth tergite of female, as seen from above, about 0.9 as long as wide; ovipositor about 0.50 as long as front wing.

This species has four subspecies, one in Europe, one in northwestern North America, one in western United States and southern British Columbia, and one in eastern North America. These differ in color and in the male tyloids.

Intergrades between the subspecies *yukonensis* and *rufiscutum*, both in coloration and in the male tyloids, are very common. The intergrades at hand are not recorded under either of the subspecies, so are listed as follows: 2♂, reared from *Pinus contorta* tip infested with *Pissodes*, Mile 8 of High Divide Trail, Alta., Mar. 2, 1942 (Ottawa). ♀, reared from cerambycid burrow, Wellington, B.C., May 20, 1945, R. Guppy (Townes). 2♀, Wellington, B.C., May 20 and 24, 1948, R. Guppy (Townes). ♂, Alum Rock Park, Santa Clara Co., Calif., Mar. 24, 1949, P. D. Hurd (Berkeley). ♀, Crescent City, Calif., Aug. 3, 1940, H. and M. Townes (Townes). ♀, Eureka, Calif., May 24, H. S. Barber (Washington). ♂, reared from *Callidium* sp., Stanford University, Calif., Nov. 4, 1914, F. M. Trimble (Washington). ♂, Poudre Lake, Rocky Mountain National Park, 11,000 ft., H., G., and D. Townes (Townes). ♂, Houser Lake, Idaho, May 24, 1925, A. L. Melander (Cambridge). ♀, Onah, Man., June 4, 1924, R. M. White (Ottawa). ♂, Avalanche Lake, Glacier National Park, Mont., July 14, 1935, A. L. Melander (Cambridge). ♂, Eugene, Oreg., Apr. 24, 1929, H. A. Scullen (Corvallis). ♀, Hood River, Oreg., Oct. 4, 1929, D. G. Gillespie (Washington).

The subspecies may be distinguished by the following key:

1. Basal 0.15± of hind tibia white or stramineous, much paler than the rest of the tibia; range: east of Rocky Mountains.
   5d. albator canadensis (Provancher)

   Basal 0.15 of hind tibia approximately concolorous with the rest of the tibia, not conspicuously paler 2
2. Male tyloids occurring on about five segments as obliquely longitudinal ridges; front and middle coxae of female whitish; flagellum of female without a white band; thorax usually with fulvous areas; range: British Columbia to Arizona.
   5c. albator rufiscutum Cushman

   Male tyloids occurring on 7 or more segments as sharply raised, short ridges, that in profile appear more or less triangular; front and middle coxae of female fulvous; flagellum of female with a narrow white band; thorax usually without fulvous areas 3
3. Hind femur entirely fulvous, without an apical infuscation; male tyloids on about 7 segments, the profile of basal tyloids truncate; range: Europe.
   5a. albator albator (Thunberg)

Hind femur fulvous with its apical 0.15± weakly to strongly infuscate; male tyloids on about 9 segments, the profile of all of them sharply pointed; range: Oregon and Idaho to Alaska. . . . . **5b. albator yukonensis** (Ashmead)

5a. Helcostizus albator albator (Thunberg)

Ichneumon albator Thunberg, 1822, Mém. Acad. Sci. St. Pétersbourg, vol. 8, p. 257 [key]; 1824, vol. 9, p. 300 [description]; [♀]. Type: ♀, Sweden? (Uppsala).

Tyloids of male flagellum occurring on about 7 segments, formed as high short ridges, the basal ones in profile mesalike, the more distal ones triangular in profile.

Differs in color from the subspecies *yukonensis* in having hind femur uniformly fulvous, without an apical infuscation, and hind tibia and tarsus medium brown rather than dark brown. The hind coxa of male is black and the first hind trochanter of male is mostly fuscous.

Specimens: 4♂, 6♀, from Germany and Sweden.

This subspecies is widely distributed in Europe. It is recorded in literature as parasitic on *Saperda calcarata* and *Callidium glabratum.*

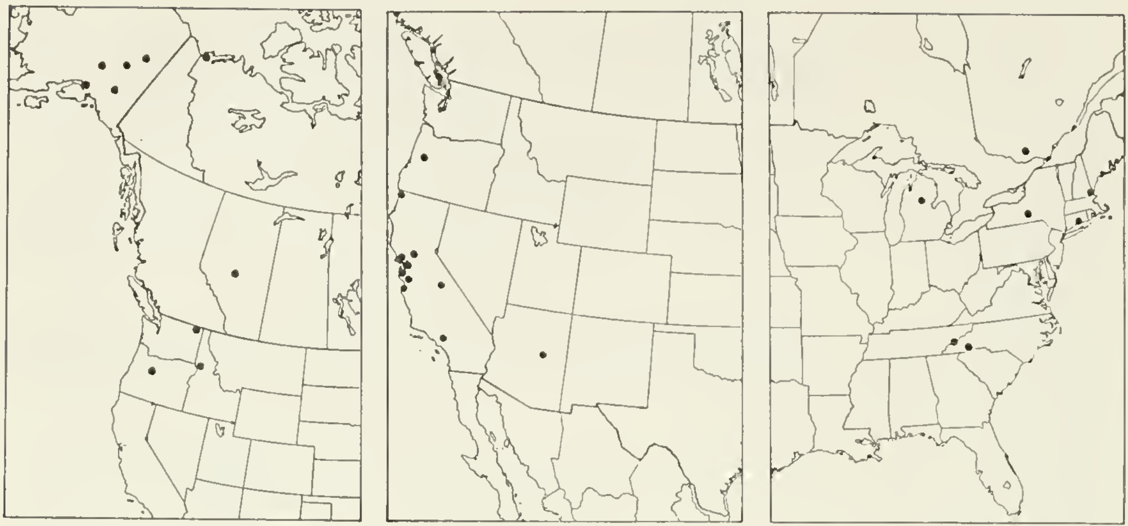
5b. Helcostizus albator yukonensis (Ashmead), new status

Pimpla yukonensis Ashmead, 1890, Proc. U.S. Nat. Mus., vol. 12, p. 445; ♀. Type: ♀, Fort Yukon, Alaska (Washington).

Tyloids of male flagellum occurring on about 9 segments, in profile appearing as triangular points, the distal ones progressively smaller and sharper.

Male: Black. Face, cheek, sometimes lower part of temple, clypeus, mouth parts, front of scape and pedicel, often a large area on propleurum, sometimes small stripe on lower edge of pronotum, hind corner of pronotum, tegula, often spot on subtegular ridge, and front and middle coxae and trochanters, white; femora fulvous, the apical 0.12± of hind femur weakly infuscate; front and middle tibiae fulvous; front tarsus brownish fulvous, the last segment dark brown; middle tarsus brown, darkest apically; hind coxa black or fulvous; hind trochanters fulvous, the first hind trochanter more or less infuscate; hind tibia rather dark brown, its base sometimes paler brown; hind tarsus fuscous brown. The front and middle coxae are sometimes more or less fulvous.

Female: Black or blackish. Face often with a whitish median spot near its upper edge; cheek sometimes stramineous next to mandible; labrum stramineous; first two segments of maxillary palpus and first three of labial palpus whitish, the rest of the palpi fuscous; flagellum with a white band that covers two segments; extreme hind corner of pronotum white or stramineous; tegula white; mesosternum and mesopleurum and metapleurum sometimes more or less fulvous;



FIGURES 303–305.—Localities: 303 (left), *Helcostizus albator yukonensis;* 304 (center), *H. a. rufiscutum;* 305 (right), *H. a. canadensis.*

front and middle legs fulvous, their tarsi brown apically; hind coxa, trochanters, and femur fulvous, the apical 0.2± of femur infuscate except that its extreme apex is stramineous; hind tibia and tarsus uniformly dark brown.

The male listed below from Edmonton, Alta., is a little intermediate to the subspecies *canadensis*. We have many intermediates to the subspecies *rufiscutum*. These are listed in the last paragraph under the specific heading.

Specimens: ♂, Anchorge, Alaska, June 24, 1951, R. S. Bigelow (Ottawa). ♂, Fairbanks, Alaska, July 3, 1921, J. M. Aldrich (Washington). ♂ (paratype), Fort Yukon, Alaska, 1877, L. M. Turner (Washington). ♂, 2♀, Gulkana River, Alaska, 1955, G. Schumann (Washington). ♀, Mount McKinley at 1,600 ft., Alaska, Aug. 8, 1954, D. Townes (Townes). ♀, Mount McKinley National Park, Alaska, 1932, F. W. Morand (Washington). ♂, 2♀, Edmonton, Alta., Aug. 19, 1923, E. H. Strickland (Townes). ♀, Craig Mts., Idaho, June 8, 1918, A. L. Melander (Cambridge). ♀, Reindeer Depot, Mackenzie Delta, N.W.T., July 17, 1948, W. J. Brown (Ottawa). ♀, Santiam "National Forest," Oreg., Aug. 27, 1914, W. J. Chamberlin (Cambridge). ♀, Metaline Falls, Wash., June 7, 1931, D. DeLeon (Washington).

This subspecies ranges from Alaska to Oregon and Idaho.

5c. Helcostizus albator rufiscutum Cushman, new status

Helcostizus rufiscutum Cushman, 1919, Proc. U.S. Nat. Mus., vol. 55 p. 533; ♀. Type: ♀, Cypress Point, Monterey, Calif. (Washington).

Tyloids of male antenna occurring on about 5 segments, in the shape of low rounded ridges that are obliquely longitudinal in position.

Male: Colored like the subspecies *yukonensis* except that hind coxa is always fulvous and that mesopleurum and metapleurum, mesosternum, and mesoscutum are usually more or less fulvous.

Female: Black or blackish. Cheek near base of mandible and clypeus often tinged with brown; mandible brown; labrum stramineous; first three segments of palpi white or mostly whitish, the rest infuscate; scape sometimes with stramineous spot in front; lower part of propleurum sometimes partly whitish; tegula and hind corner of pronotum white; mesoscutum, mesopleurum, mesosternum, and metapleurum usually more or less fulvous; front and middle coxae and trochanters white or largely whitish; front and middle legs beyond trochanters pale fulvous, their tarsi brownish fulvous with the apical segment brown to fuscous; hind coxa and first trochanter fulvous; hind second trochanter fulvous or whitish; hind femur fulvous, its apex often weakly infuscate, its apical margin whitish; hind tibia and tarsus uniformly dark brown.

Specimens: ♀, Workman Creek, Sierra Ancha, Ariz., Apr. 28, 1947, H. and M. Townes (Townes). ♂, Bowser, B.C., June 7, 1955, R. Coyles (Ottawa). 2♂, reared from borings of *Plectura spinicauda*, Wellington, B.C., May 15, 1945, R. Guppy (Townes). ♀, Berkeley, Calif., Apr. 17, 1929, A. T. McClay (Washington). ♀, Berkeley, Calif., May 25, 1933, M. Cazier (Washington) ♂, 3♀, Gasquet Ranger Station, Calif., July 23, Aug. 2, and Sept. 14, 1937, R. L. Furniss (Washington). ♀, near Glacier Point, Yosemite Park, Calif., July 19, 1948, H., M., D., G., and J. Townes (Townes). ♀, reared from *Rhus diversiloba*, Glendale, Los Angeles Co., Calif., Apr. 1, 1948 (Townes). ♂, Mill Valley, Marin Co., Calif., Sept. 4, 1957, H. B. Leech (San Francisco). ♀, Portola State Park, San Mateo Co., Calif., May 7, 1950, H. B. Leech (San Francisco). ♀, Putah Canyon, Solano Co., Calif., Feb. 29, 1936, R. M. Bohart (Townes). ♂, San Anselmo, Calif., Apr. 16, 1922, E. P. Van Duzee (San Francisco). 2♂, 5♀, reared from *Cupressus macrocarpa*, San Carlos, Calif., Jan. 31, 1919, and Mar. 29, 1919, R. D. Hartman and H. E. Burke (Washington and Townes). ♀, Eugene, Oreg., Nov. 7, 1941 (San Francisco).

This subspecies ranges from British Columbia to Arizona.

5d. Helcostizus albator canadensis (Provancher), new status

Mesochorus Canadensis Provancher, 1874, Naturaliste Canadien, vol. 6, p. 299; ♀. Type; ♀, Quebec (Quebec).

Asternaulax fiskei Viereck, 1912, Proc. U.S. Nat. Mus., vol. 42, p. 632; ♀. Type: ♀, Tryon, N.C. (Washington).

Body a little more slender than in the other subspecies; tyloids on male flagellum as in the subspecies *yukonensis;* propodeum about 0.85 as long as wide.

Male: Black. Face, clypeus, cheek, mouth parts, mark on front of scape and pedicel, most of propleurum, small stripe on lower margin of pronotum, small hind corner of pronotum, tegula, and front and middle coxae and trochanters, white; front legs beyond trochanters light fulvous (apex of front tarsi of only available specimen missing); middle femur and tibia light fulvous, the tibia paler basally; middle tarsus brown; hind coxa and femur fulvous, the apical 0.25 of femur faintly infuscate and its extreme apex whitish; first hind trochanter fulvous, paler below and brownish above; second hind trochanter whitish; hind tibia infuscate brown, its basal 0.18 whitish; hind tarsus fuscous brown, lighter brown at the incisures.

Female: Black. Face usually with a median whitish mark near its upper margin; labrum whitish; mandible tinged with ferruginous; basal 3 segments of palpi whitish, the rest infuscate; flagellum with a white band covering about 2.3 segments, the band interrupted below; extreme hind corner of pronotum stramineous; tegula white; front and middle coxae, trochanters, and femora fulvous, the femora with a faint apical infuscation except that extreme apex is stramineous; front tibia stramineous, with a brownish dorsal stripe; front tarsus fulvous brown, its last segment dark brown; middle tibia fulvous brown, paler at base; middle tarsus brown, darkest apically; hind coxa, trochanters, and femur fulvous, the apical 0.25 of femur infuscate except that extreme apex is stramineous; hind tibia fuscous, its basal 0.15 stramineous; hind tarsus black, the basitarsus light brown at extreme base.

Specimens: ♀, "reared," Lyme, Conn., May 13, 1918, Champlain (Washington). ♂, Clare Co., Mich., July 23–28, 1959, R. R. Dreisbach (Dreisbach). 5♀, bred from *Chamaecyparis*, Rye, N.H., W. F. Fiske (Washington). ♀, Ithaca, N.Y., May 23, 1936, H. Townes (Townes). ♂, ♀, reared Jan. 13, 1942, and Dec. 6, 1941, Larrimac [Links], Que. (Ottawa). ♀, Great Smoky Mountains National Park, 6,600 ft., Tenn., July 2, 1955, H. and A. Howden (Townes).

This subspecies occurs in the Alleghanian fauna.

5. SUBTRIBE SPHECOPHAGINA

Clypeus small, its apical margin straight or concave, without a median apical tooth or lobe; mandible about 1.6 as long as it is wide at the middle, its teeth of about equal length; flagellum of moderate thickness, in female less flexible than in other subtribes, its tip not slender, its apex with a rounded point; thorax short; propodeum short, the basal carina of propodeum strong, weak, or absent; apical carina of propodeum weak, obscured by wrinkling, or sometimes moderately strong, without sublateral crests; sometimes propodeum with some longitudinal carinae or strong wrinkles (fig. 326,b); propodeal spiracle round or elliptic; front tibia of female not inflated; fourth tarsal segment of female with a few weak bristles at apex, not bilobed; areolet absent, not even a trace left of the second intercubital vein; first intercubitus sometimes (in *Latibulus*) distad of second recurrent vein; first tergite parallel-sided or more or less expanded apically, its spiracle somewhat behind the middle; a pair of dorsal impressions present on each of tergites 2–6 except in *Sphecophaga;* ovipositor short, not surpassing tip of abdomen, its apex depressed or compressed, the dorsal valve sometimes with obliquely transverse ridges; female subgenital plate large, rhomboidal, weakly convex, reaching about to apex of ovipositor.

This subtribe is parasitic in the paper nests of social Vespidae. There are only three genera, of which one is Nearctic. The other two are *Latibulus* (Palearctic and Oriental) and *Arthula* (Oriental and Australian).

Genus Sphecophaga

FIGURE 326,b

Sphecophaga Westwood, 1840, Introduction to the modern classification of insects, vol. 2, synopsis of the genera . . . , p. 57. Type: *Anomalon vesparum* Curtis; original designation.

Chyronomon Desvignes, 1856, Catalogue of the British Ichneumonidae . . . British Museum, p. 47. Type: *Anomalon vesparum* Curtis; monobasic.

Cacotropa Foerster, 1868, Verh. Naturh. Rheinlande, vol. 25, p. 208. Type: (*Cacotropa sericea* Thomson) = *vesparum* (Curtis); included by Thomson, 1888.

Front wing 4.0 to 6.5 mm. long (or sometimes vestigial); body short and stout; propodeum with some strong longitudinal wrinkles that appear like longitudinal carinae; intercubitus rather long, basad of second recurrent vein; tergites 2–5 without impressions.

Sphecophaga has only one species, which is Holarctic. It is a moderately common parasite in *Vespula* nests.

1. Sphecophaga vesparum (Curtis)

Front wing 4.0 to 6.5 mm. long in specimens with fully developed wings, shorter in brachypterous specimens. General structural features as described under the generic heading and illustrated in figure 326,b. Color as described under the subspecies and forms.

This species has two very distinct forms, which in Europe have sometimes been treated as different species. In America, Cushman (1933) and Schmieder (1939) have considered them to belong to the same species, and Schmieder has discussed the reasons for this view in some detail. Reichert (1910, Ent. Jahrb., Leipzig, vol. 20, pp. 180–182) published observations on the European species that also support the view that there is a single polymorphic species involved. Definite proof that the two forms are either the same species or two different species is still lacking. We consider them the same because:

1. The morphological and color differences between the two forms are more quantitative than qualitative, and are rather variable, with no really absolute differences.
2. Both forms have the same geographic range, same hosts, and are usually reared from the same host cells.
3. The two forms have similar color races or subspecies in the different parts of their ranges.
4. The "summer form" is not known to overwinter.

Considering the two forms as the same species, and piecing together the published information and what can be deduced from museum specimens, the biology appears to be as follows: Overwintering is as larvae, pupae, or adults in tough, angular, ribbed cocoons in the bottoms of the cells of the host nests (ordinarily *Vespula* spp.). These hatch in mid-spring or early summer into the "overwintering form," which consists of both sexes. (There is one record of such cocoons hatching in their third year.) In reared material males of the overwintering form are about one third as common as females. Collected males are very scarce. The overwintering form disappears in the field in early summer, by which time the females have presumably located new small nests of *Vespula* and parasitized some of the cells. By late July parasitized cells occur in moderate numbers in a portion of *Vespula* nests. Parasitized cells increase until the end of summer.

The parasite larvae are found in the pupal cells of the wasp. Morley states (1900, Ent. Monthly Mag., vol. 36, p. 120) that they occur first on the growing larvae, but this seems improbable. There are one to about seven parasite larvae per host. They feed on the abdomen of the pupa and when mature spin cocoons in the bottom of the cell. The bottommost cocoons are tough, ribbed, and yellow or light brown. These overwinter and hatch the following spring as males and females of the "overwintering form." Many such cocoons brought into the laboratory have hatched in the fall, but this may not be common in nature. Above the bottommost angular, tough cocoons are usually some flimsy whitish cocoons, spun apparently by larvae of the same batch. These hatch in a few days as the "summer form," consisting only of females and often brachypterous. The summer form females usually stay in the nest and parasitize more cells. Fully winged specimens of this form are not rare in the open, however, so some of them must fly about and infest new nests.

The two forms may be distinguished in the adult as follows:

Overwintering form: Males and females; clypeus about 2.8 as wide as it is long on the midline, its apical 0.45± inflexed; white or pale yellow markings on head and pronotum rather extensive, the anterior orbit being entirely white or pale yellow; areola usually shorter, and narrower in front; propodeal carinae a little weaker; wings fully developed; first abdominal tergite about 1.5 as long as wide; abdomen beyond first segment entirely fulvous or ferruginous; size averaging larger.

Summer form: Females only; clypeus about 2.5 to 2.8 as wide as it is long on the midline, its apical 0.3 to 0.4 inflexed; white or pale yellow markings on head and pronotum reduced or lacking except on hind corner of pronotum, the anterior orbit often having little or no white or yellow; areola usually a little longer and less distinctly narrowed in front; propodeal carinae a little stronger; wings fully developed or reduced in size; first abdominal tergite about 1.1 as long as wide; abdomen beyond first segment usually more or less fuscous; size averaging smaller.

Independent of the seasonal forms, the species is divisible into a European and an American subspecies, distinguishable as follows:

1. Coxae and trochanters black or dark brown; range: Europe.
1a. vesparum vesparum (Curtis)

Coxae and trochanters fulvous, ferruginous, or sometimes light brown; range: North America . . . . **1b. vesparum burra** (Cresson)

1a. Sphecophaga vesparum vesparum (Curtis)

Anomalon vesparum Curtis, 1828, British entomology; . . . , vol. 3, pl. 198; ♀. Types: ♀, Manchester, England (?Melbourne). This name was based on the summer form.

Tryphon vesparum Ratzeburg, 1852, Die Ichneumoniden der Forstinsekten . . . , vol. 3, p. 128; ♀. Type: ♀, Germany (destroyed during World War II). This name was based on the summer form.

Cacotropa sericea Thomson, 1888, Opuscula entomologica, fasc. 12, p. 1259; ♂, ♀. Types: ♂, ♀, from Östergöthland [Sweden], Germany, and Switzerland (Lund). This name was based on the overwintering form.

Sphecophaga thuringiaca Schmiedeknecht, 1914, Opuscula ichneumonologica, fasc. 36, p. 2824; ♀. Types: ♀, Blankenburg, Thuringia, Germany (?Berlin). New synonymy. This name was based on the summer form.

Biology: A number of papers on biology are in European literature.

Coxae and trochanters black or blackish.

Overwintering form: Black. Anterior orbits, line on cheek, palpi, tegula, subtegular ridge, and more or less distinct but usually incomplete upper, lower, and front margins of pronotum, white; front and middle legs beyond trochanters fulvoferruginous, the upper and front sides of their tibiae stramineous and their tarsi somewhat infuscate; hind femur and tibia ferruginous, the apex of the femur and base and apex of the tibia usually weakly infuscate; hind tarsus fuscous, reddish brown at the joints; abdomen ferruginous, its first segment black with the apex ferruginous. The above applies to the female, which is the only sex we have. Thomson described the male as having the frontal orbit, face, cheek, mouth, and moderately extensive thoracic markings whitish, as in the male of the subspecies *burra*.

Specimens: 6♀, from Sweden, England, and Germany, all macropterous.

Summer form: Black. Anterior orbit usually with small disconnected whitish markings; palpi whitish; tegula, subtegular ridge, hind corner of pronotum, and usually the collar, white; legs colored about as in overwintering form, but usually a little darker and more extensively infuscate; first abdominal segment black, its apex sometimes tinged with ferruginous; second tergite entirely fuscous or its apical part and often more or less of sides ferruginous; third tergite entirely ferruginous or partly fuscous, sometimes entirely fuscous; fourth and following tergites fuscous, or sometimes partly ferruginous.

Specimens: 14♀, from Sweden, England, Germany, and northern Italy, three of them dwarf and brachypterous, the rest macropterous.

This subspecies is widespread in Europe. It parasitizes several species of *Vespula* and is reported also as a parasite of *Osmia*. According to literature, its biology is similar to that of the American subspecies. Morley (1900, Ent. Monthly Mag., vol. 36, pp. 117–124) has given a good summary of the British accounts of its biology. See also the paper by Reichert cited under the specific discussion.

1b. Sphecophaga vesparum burra (Cresson), new status

Euceros burrus Cresson, 1869, Canadian Ent., vol. 1, p. 104; ♀. Type: ♀, Ottawa, Ont. (Philadelphia). This name was based on the overwintering form.

Sphecophagus (!) ? *praedator* Zabriskie, 1894, Journ. New York Ent. Soc., vol. 2, p. 84; ♂, ♀. Types: ♂, 3♀, New Baltimore, N.Y. (lost). In the New York museum are some cocoons and a mature male pupa from the original material but the four specimens on which the description was based cannot be located. This name was based on the overwintering form.

Biology: Couper, 1870, Canadian Ent., vol. 2, pp. 52–53.—Zabriskie, 1894, Journ. New York Ent. Soc., vol. 2, pp. 83–85.—Cushman, 1933, Proc. Ent. Soc. Washington, vol. 35, pp. 10–11.—Schmieder, 1939, Ent. News, vol. 50, pp. 92–97.—Leech, 1954, Pan-Pacific Ent., vol. 30, p. 80.

Coxae and trochanters usually fulvous or fulvoferruginous, the coxae often infuscate basally and sometimes all of the coxae and trochanters moderately infuscate.

Overwintering form, male: Head fuscous, the face, broad frontal and vertical orbit, lower 0.6 ± of temple, and mouth parts, pale yellow; antenna dark brown, the front of its scape pale yellow; thorax fulvoferruginous, with areas in upper part of mesopleurum, around wing bases, attachments of abdomen and hind coxae and some narrow sutural markings, fuscous, the propleurum, pronotum except in the trough, mesosternum, lower and front part of mesopleurum, tegula, subtegular area, and often the center of scutellum, pale yellow; legs

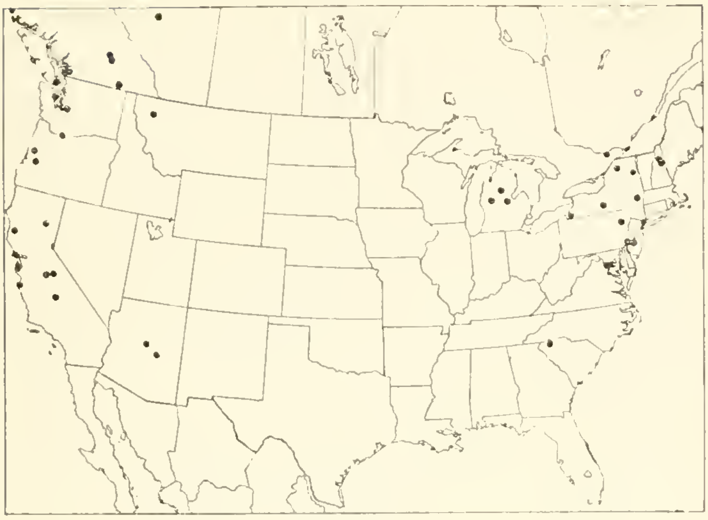


FIGURE 306.—Localities for *Sphecophaga vesparum burra.*

fulvous, the front and middle coxae and trochanters, front side of front and middle femora, and front and middle tibiae except for lower side, pale yellow; abdomen fulvoferruginous.

Overwintering form, female: Head fulvous to ferruginous, the orbits in front (broadly) and cheek, white or yellow; middle of frons and much of occiput infuscate; mouth parts variously fulvous to stramineous; antenna light to dark brown, its scape paler in front; thorax fulvous to brownish ferruginous, with varying amounts of fuscous below, near wing bases, and on sutures, the front margin (usually) and hind corner of pronotum, tegula, and subtegular ridge whitish to yellow, or light brown; legs fulvous to ferruginous; abdomen entirely fulvous to ferruginous.

Summer form, female: Head reddish brown to black, usually with anterior orbit, cheek, and part of clypeus variously marked with paler, but usually the anterior orbit not broadly white or yellow as in the overwintering form; mandible light brown; palpi stramineous; antenna brown; thorax varying from almost entirely black to mostly brownish ferruginous with extensive sutural infuscation, the tegula, subtegular ridge, hind corner of pronotum, and usually some or all of upper margin of pronotum pale brown to whitish; legs fulvous or fulvoferruginous, the coxae often with a little basal infuscation, sometimes all of the coxae and trochanters moderately infuscate; abdomen varying from entirely fulvous or ferruginous to entirely black, usually largely or entirely pale.

The subspecies has three regional races which are usually easy to distinguish: 1. In the eastern half of the continent the fuscous markings are extensive and white markings average larger and more sharply defined. In the summer form the mesoscutum is usually black or blackish. 2. In the western half of the continent, north of the latitude of San Francisco, most individuals are brownish ferruginous, but with moderately extensive sutural infuscation on the thorax. The whitish markings are restricted and rather obscure, or absent. 3. In the western half of the continent, south of the latitude of San Francisco, most individuals are almost uniformly fulvous, with little or no sutural infuscation on the thorax. The pale markings on the head and pronotum are yellowish rather than whitish. These three races have not been treated as subspecies because of the frequency of individuals colored out of conformity with their geographic location. Some of the apparently irregular variation seems to be due to nutrition, and to whether the spring or summer generation is involved. If these variables were ruled out or taken into consideration one could probably define defensible subspecies. Specimens from the Hudsonian and Canadian zones tend to have the coxae and trochanters more or less infuscate, thus approaching the coloration of the European subspecies.

Specimens of overwintering form (24♂, 75♀): From Arizona (Oak Creek Canyon and Workman Creek in Sierra Ancha); British Columbia (Robson and Victoria); California (Camp Nelson, Carmel, 4 miles south of Hat Creek, Mill Valley, and Stanford University); Montana (east shore of Flathead Lake); New York (Ithaca, New Baltimore, and New York); Oregon (Eugene); Pennsylvania (Spring Brook and West Manayunk); South Carolina (near Tigerville); and Washington (Lake Cushman in Mason Co.).

The majority of the available specimens were reared, all emerging in the fall and early winter. Field collected specimens are dated as follows: April 9 at Eugene, Oreg.; April 15 at Carmel, Calif.; April 26 at Camp Nelson, Tulare Co., Calif.; May 3 at Workman Creek, Sierra Ancha, Ariz.; May 8 near Tigerville, S.C.; May 10 at Flathead Lake, Mont.; May 21 in Oak Creek Canyon, Ariz.; June 4, four miles south of Hat Creek, Shasta Co., Calif.; June 11 at Spring Brook, Pa.; June 18 at Robson, B.C.; and July 9 at Lake Cushman, Mason Co., Wash.

Host records on pin labels include four lots reared from *Vespula maculata* and four from *Vespula* sp., and a male from a "*Polistes*" nest, Mill Valley, Calif., Feb. 4, 1953, H. B. Leech.

Specimens of summer form (90♀): From Alberta (Drayton); British Columbia (Langley, Mount Seymour near Vancouver at 700 ft., shore of Shuswap Lake near Salmon Arm, Trinity Valley, and Vancouver); California (Big Dann Creek in Mendocino Co., Mill Valley, Snow Flat in Yosemite Park at 8,700 ft., Sonora, and Stanford University); Maryland (Prince Georges Co.), Michigan (Mecosta Co., Midland Co., and Roscommon Co.); Montana (east shore of Flathead Lake); New Hampshire (Pinkham Notch and Randolph); New Jersey (Moorestown); New York (Bemus Point, Bolton, Cranberry Lake, and Six Mile Creek near Ithaca); Oregon (Corvallis and Hood River);

Pennsylvania (West Manayunk); Virginia (Dunn Loring); and Washington (La Grande and Mount Rainier at 4,700 and 5,000 ft.).

Collection dates on field collected specimens are from early summer to late summer (May 30 at Corvallis, Oreg., to August 24 at La Grande, Wash.). Reared specimens have the same seasonal distribution except for 2♀ emerging at Ithaca, N.Y., on October 20.

Host data on pin lables include five lots reared from nests of *Vespula arenaria*, two from *V. maculata*, and three from *Vespula* sp.

This subspecies is transcontinental in the Canadian and Transition zones.

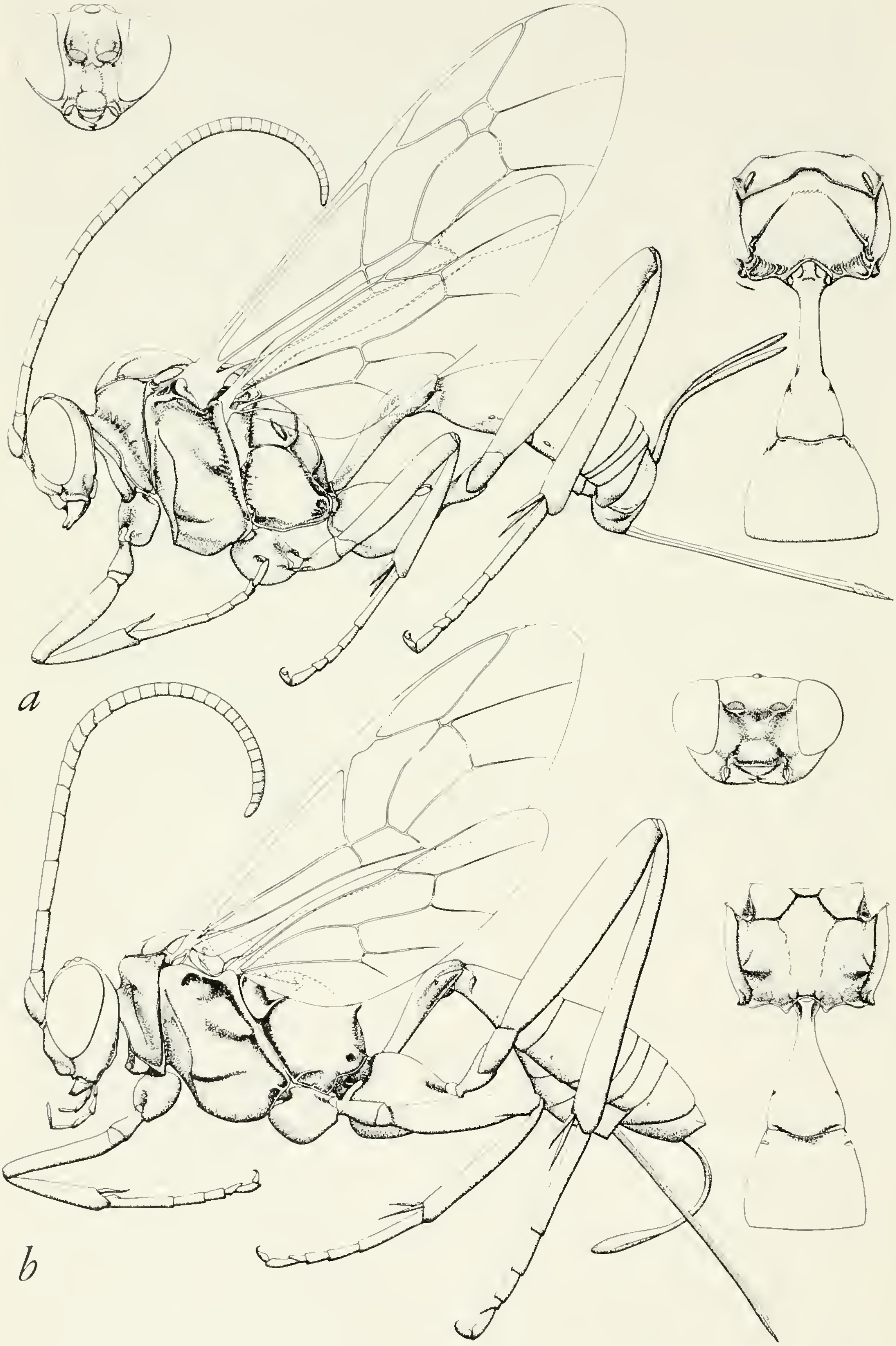


FIGURE 307.—a, *Whymperia tricolor*, ♀, representing the genus *Whymperia;* b, *Baryceros texanus*, ♀, genotype of the synonym *Crypturopsis.*

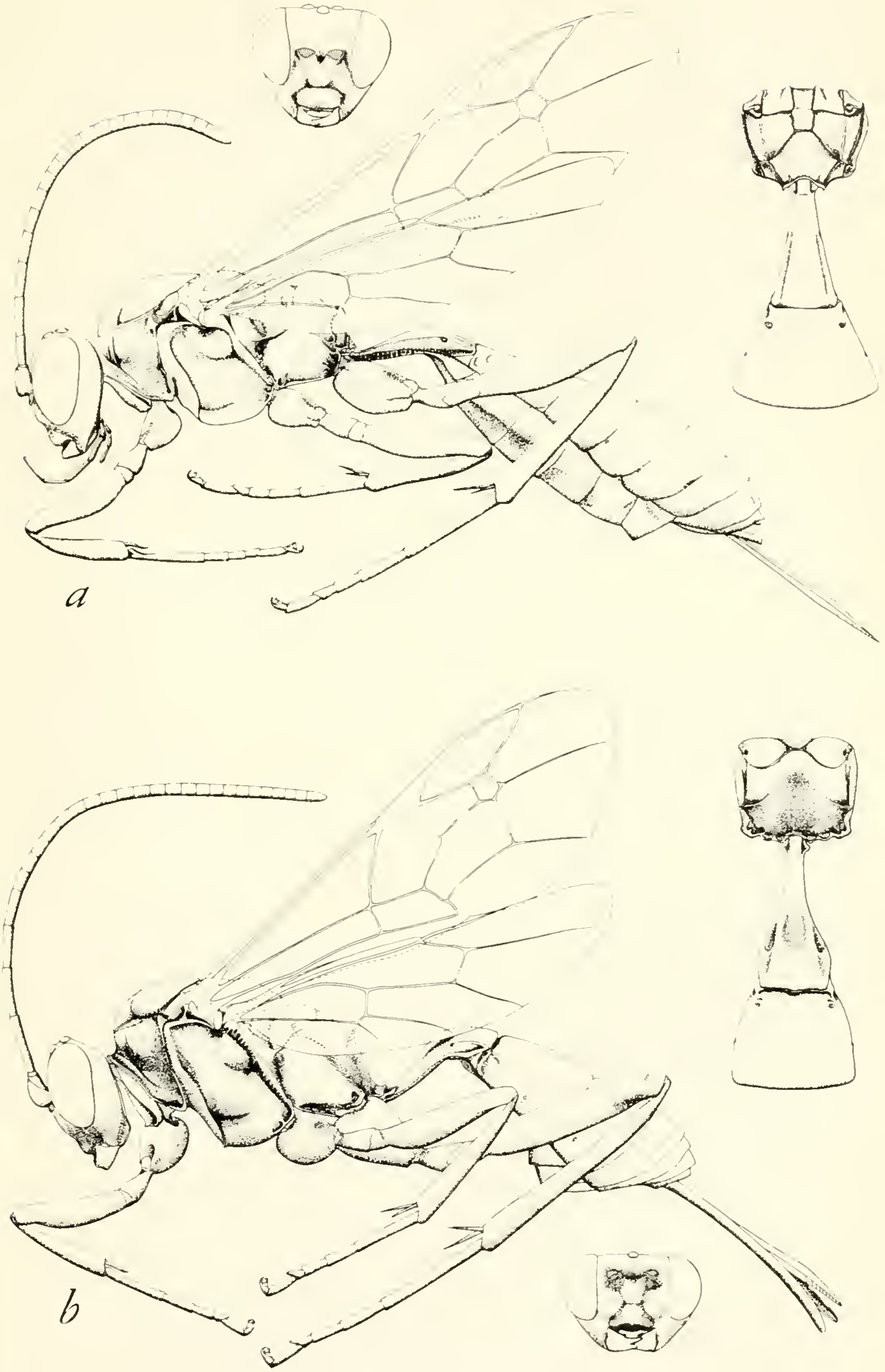


FIGURE 308.—a, *Apsilops hirtifrons*, ♀, genotype of *Apsilops*; b, *Agrothereutes solitarius*, ♀, genotype of the synonym *Spilocryptus*.

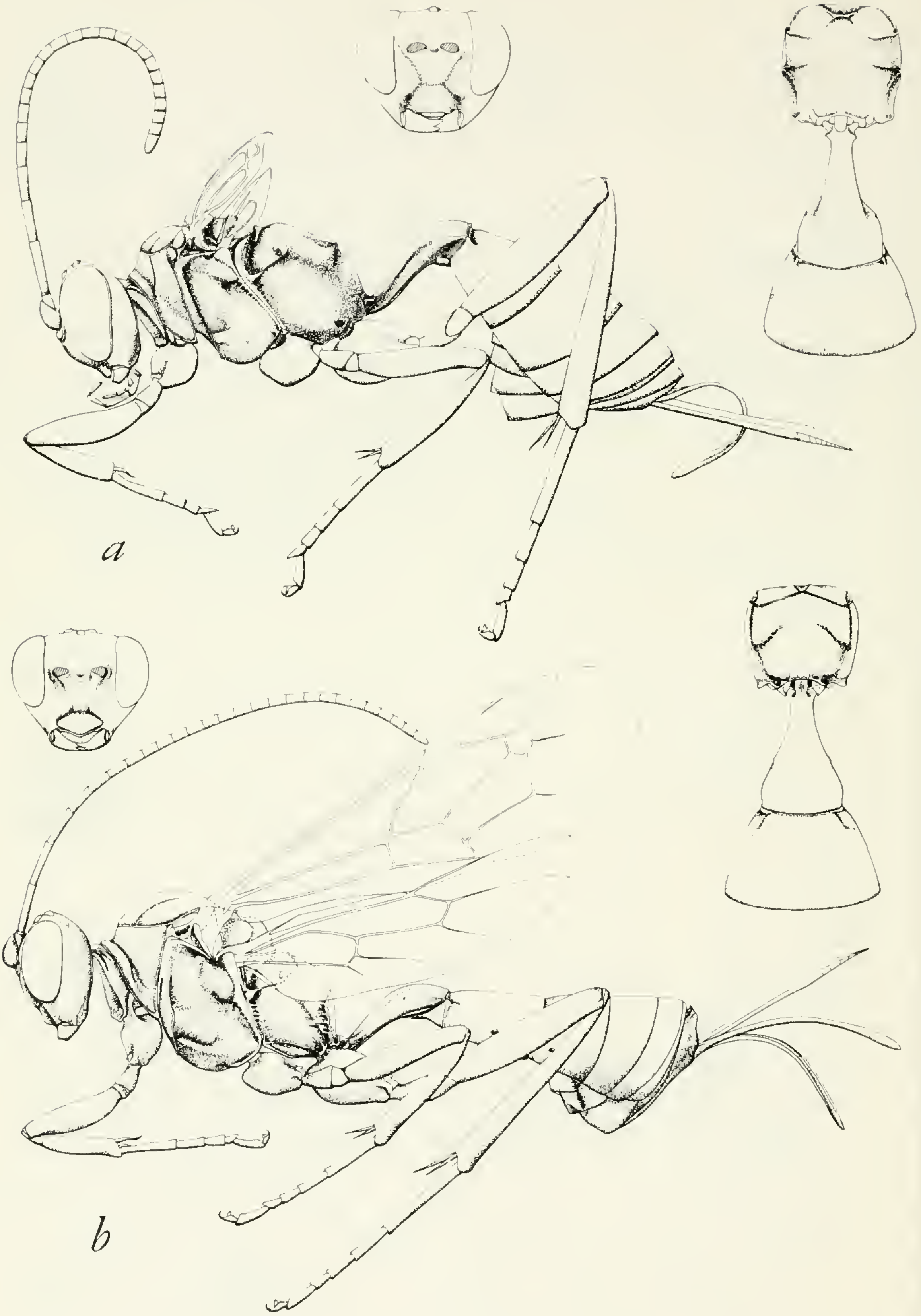


Figure 309.—a, *Agrothereutes abbreviator abbreviator*, ♀, genotype of *Agrothereutes*; b. *Gambrus incubitor*, ♀, genotype of the synonym *Kaltenbachia*

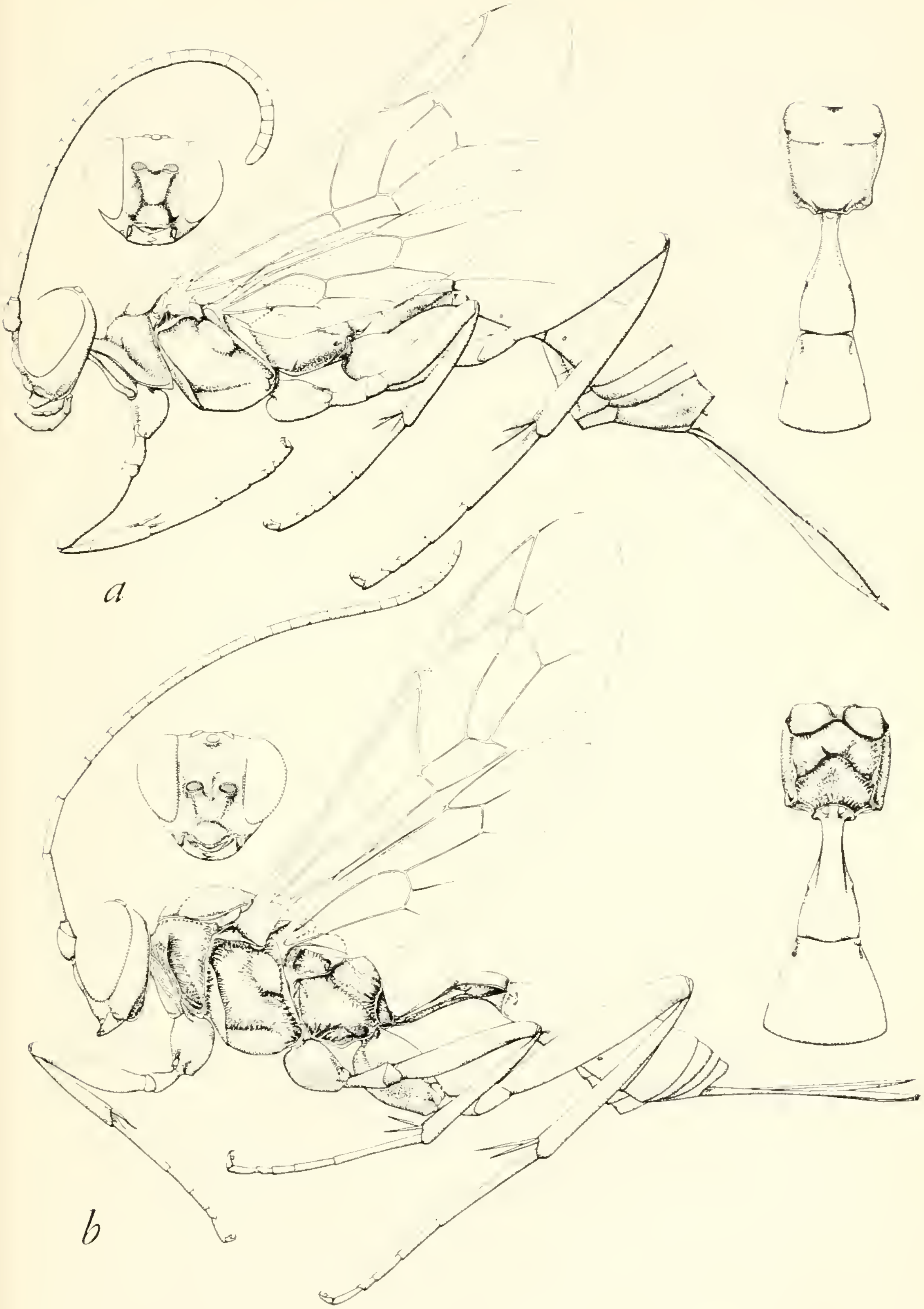


FIGURE 310.—a, *Mallochia agenioides*, ♀, genotype of *Mallochia;* b, *Aritranis fugitiva*, ♀, genotype of the synonym *Hoplocryptus*.

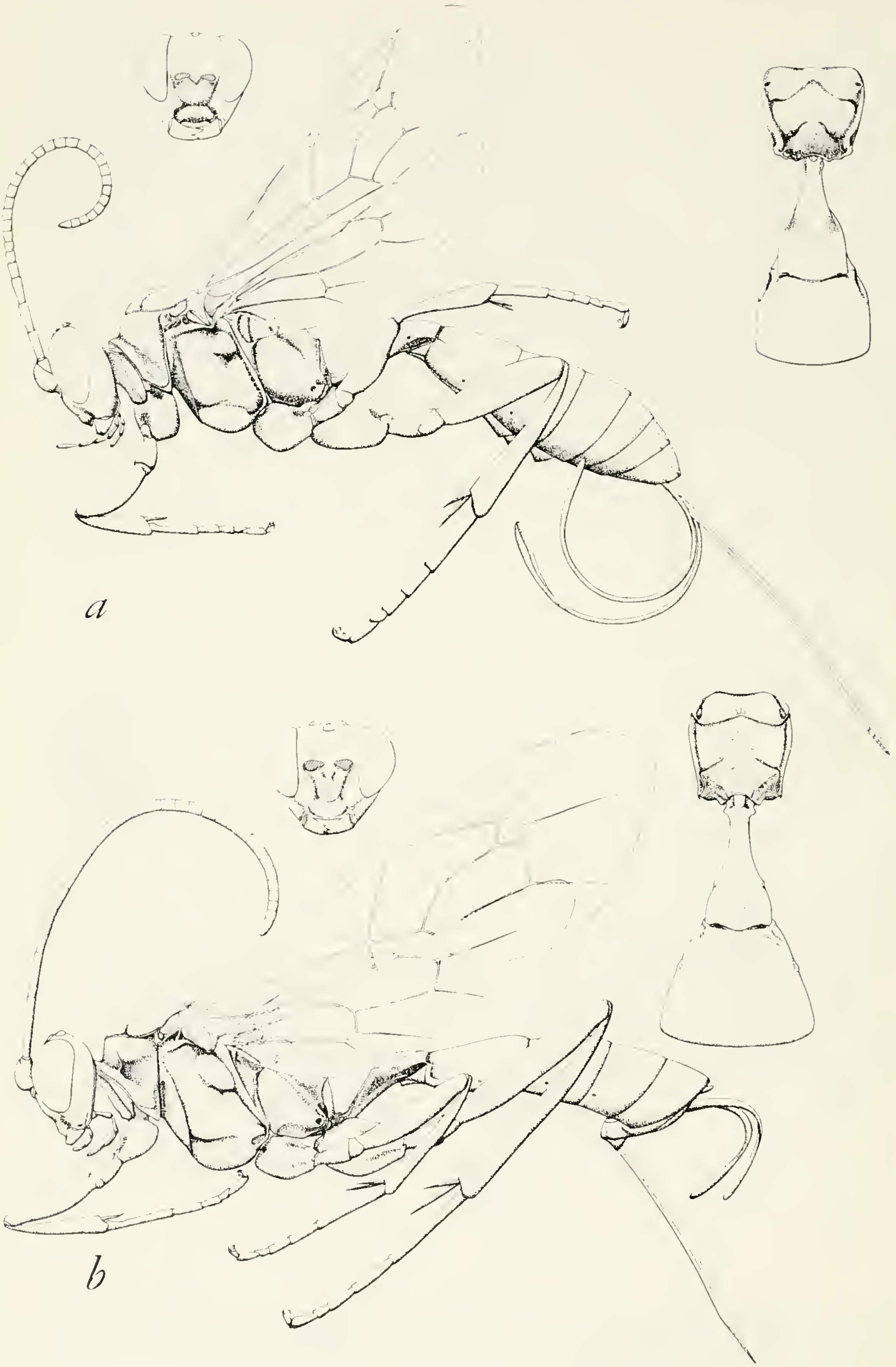
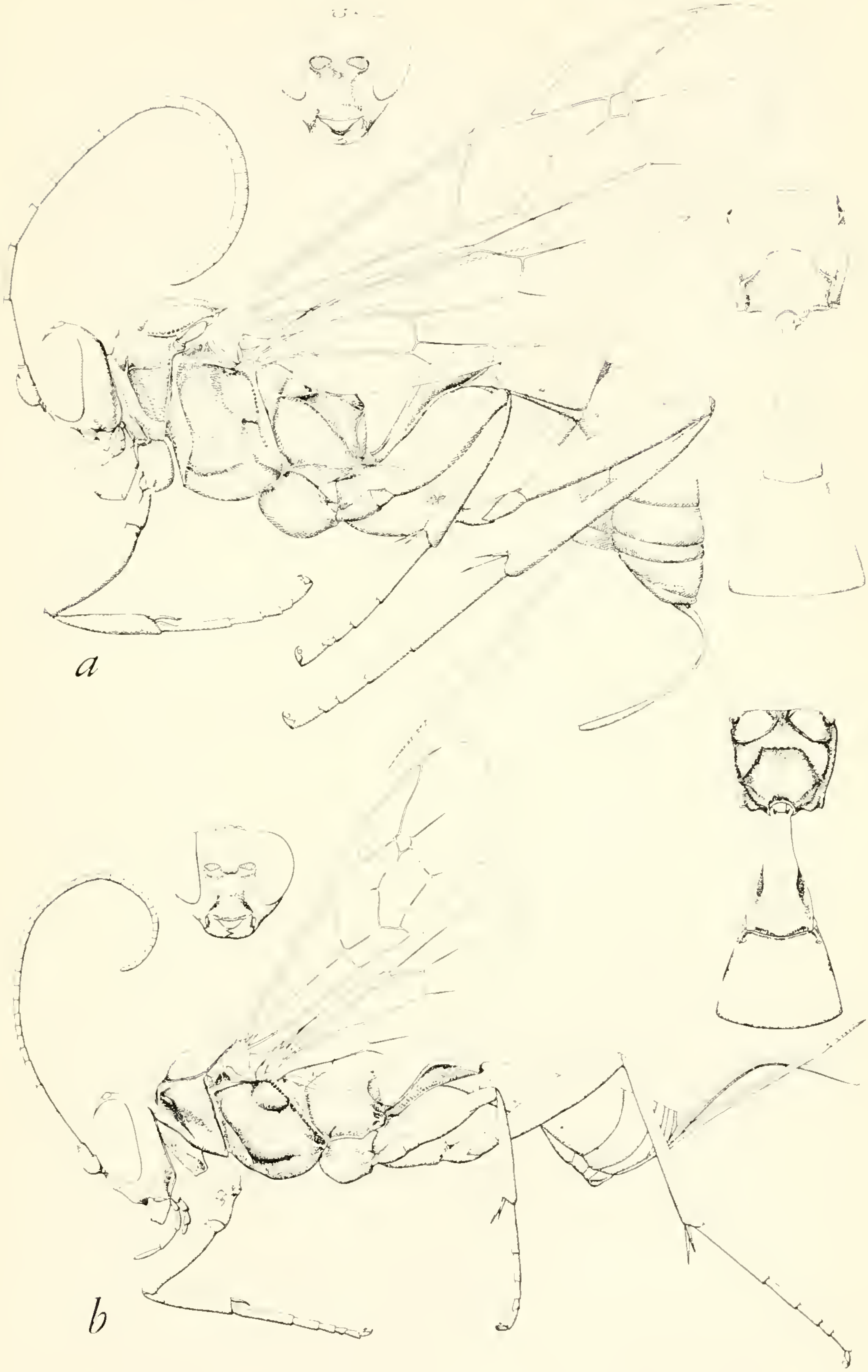


Figure 311.—a, *Pycnocryptus director*, ♀, genotype of *Pycnocryptus;* b, *Ischnus inquisitorius*, ♀, genotype of *Ischnus.*



IGURE 312.—a, *Habrocryptoides shikokuensis*, ♀, genotype of *Habrocryptoides;* b, *Trachysphyrus viduatorius*, ♀, genotype of the synonym *Cryptus*.

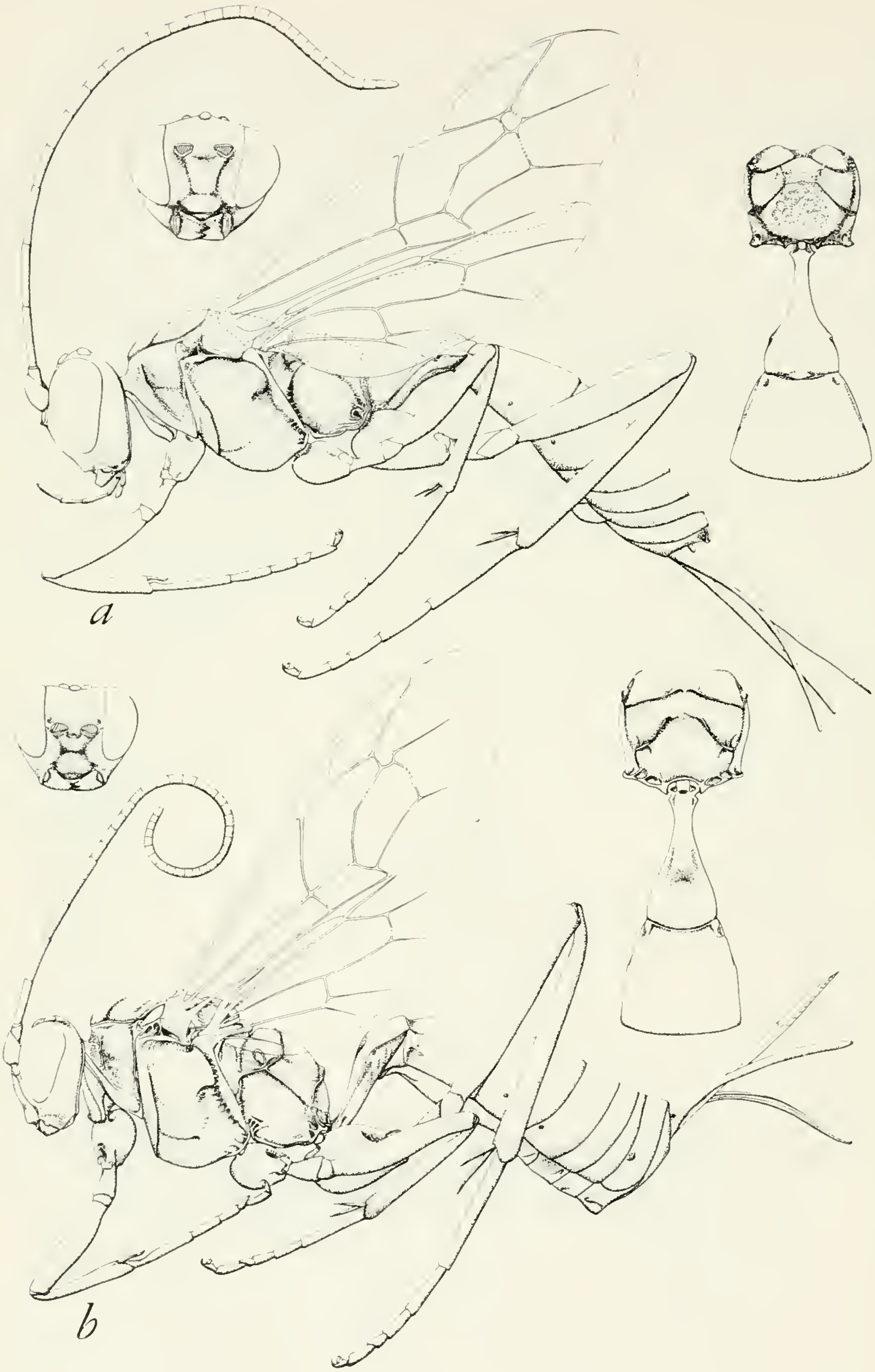


Figure 313.—a, *Chromocryptus planosae*, ♀, genotype of *Chromocryptus;* b, *Lanugo retentor*, ♀, genotype of *Lanugo*.

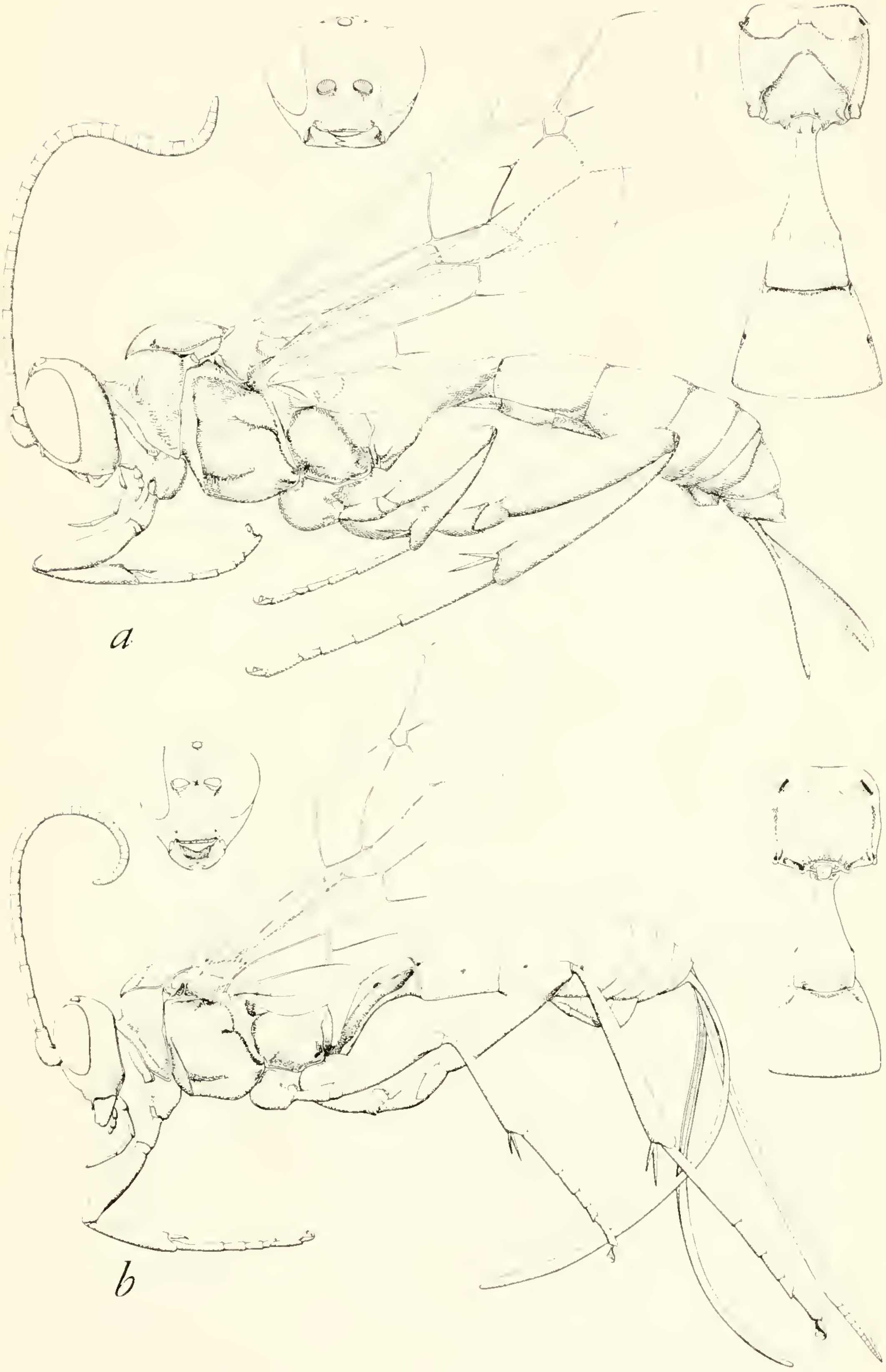


FIGURE 314.—a, *Reptatrix crassipes*, ♀, genotype of *Reptatrix;* b, *Compsocryptus calipterus*, ♀, genotype of *Compsocryptus* (the drawing is of the subspecies *brevicornis*).

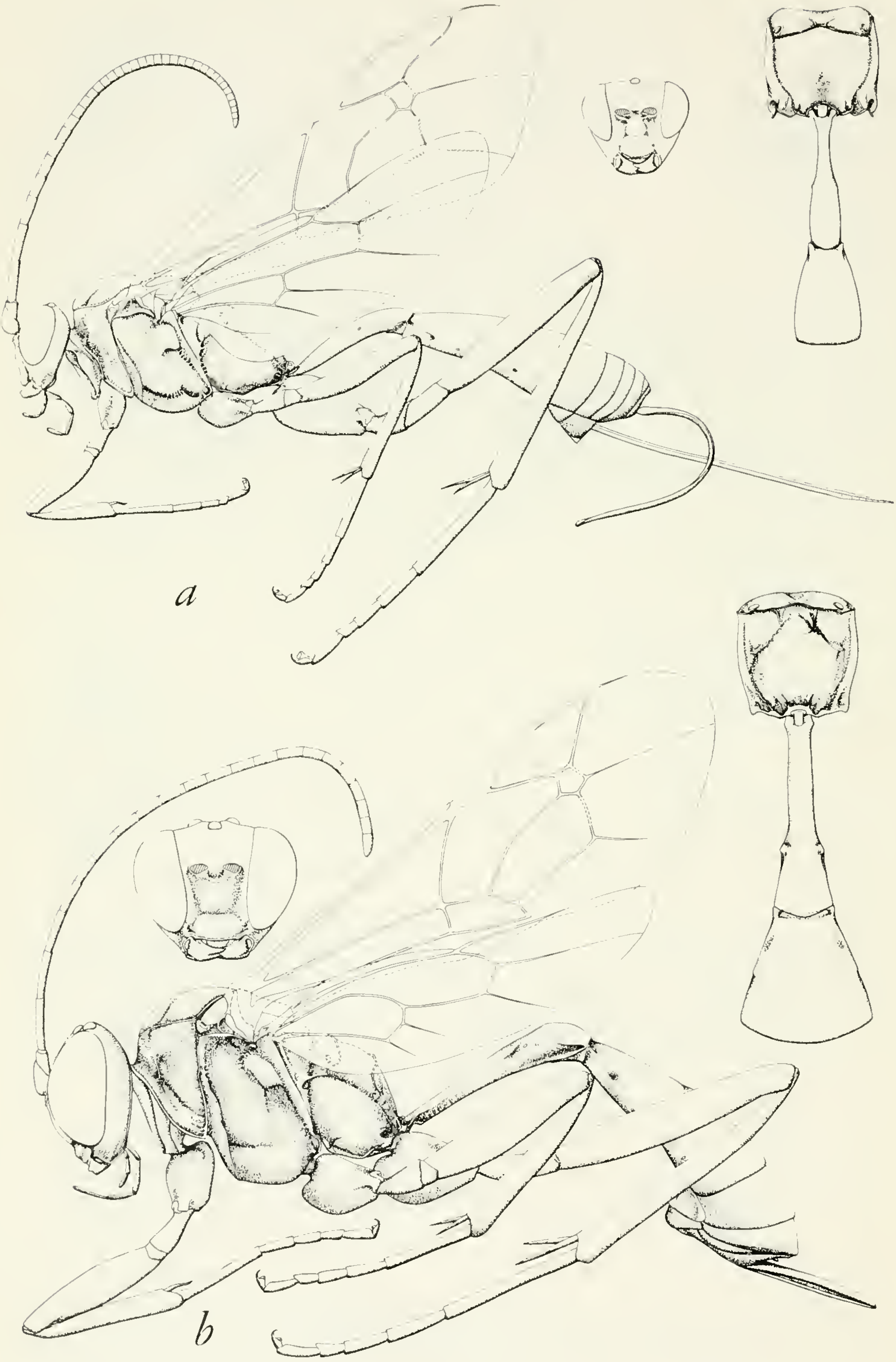


FIGURE 315.—a, *Joppidium rubriceps*, ♀, genotype of *Joppidium;* b, *Hidryta nigricoxus* ♀, representing the genus *Hidryta.*

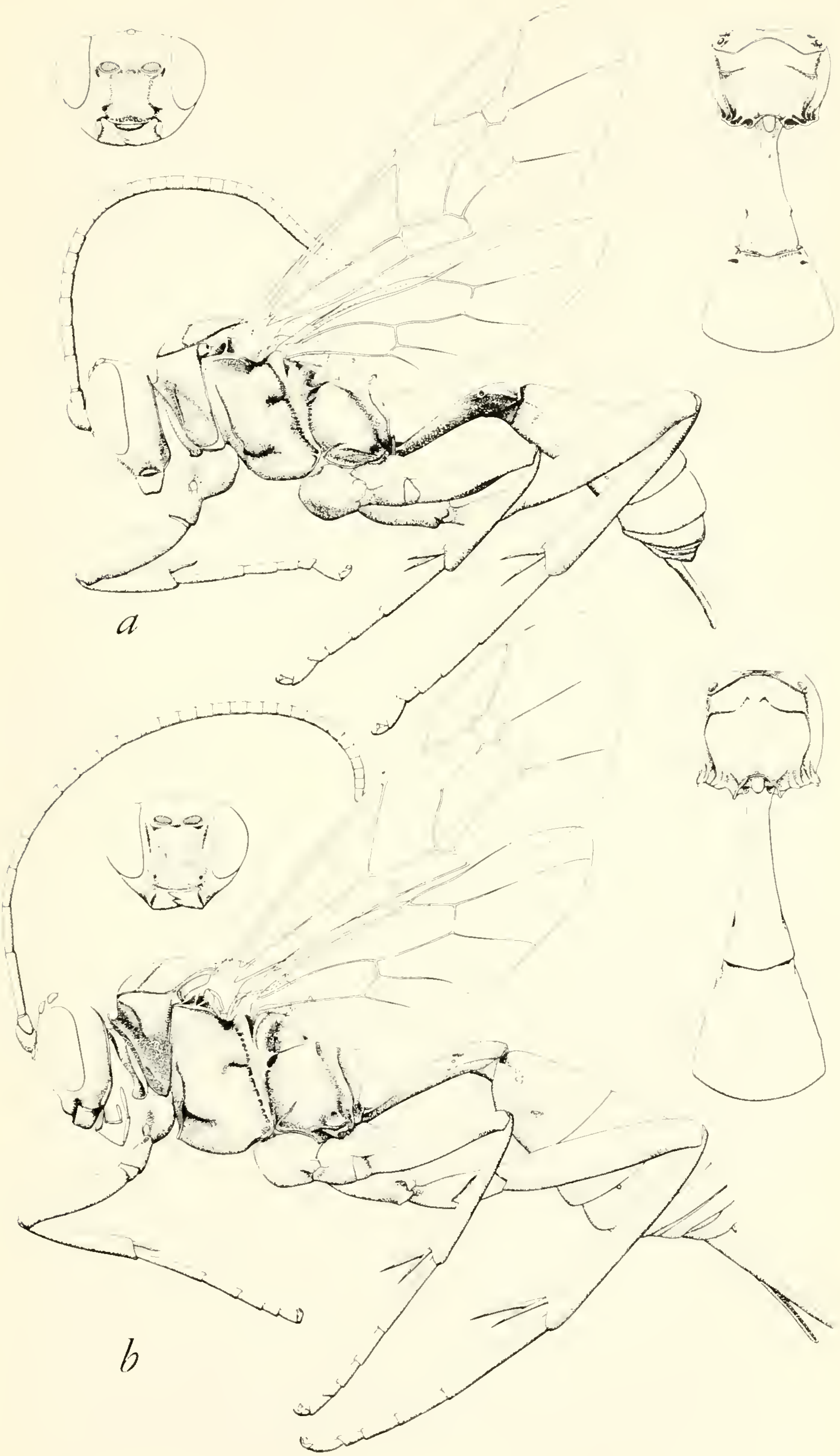


Figure 316.—a, *Idiolispa analis*, ♀, genotype of *Idiolispa;* b, *Trychosis neglecta*, ♀ representing the genus *Trychosis*.

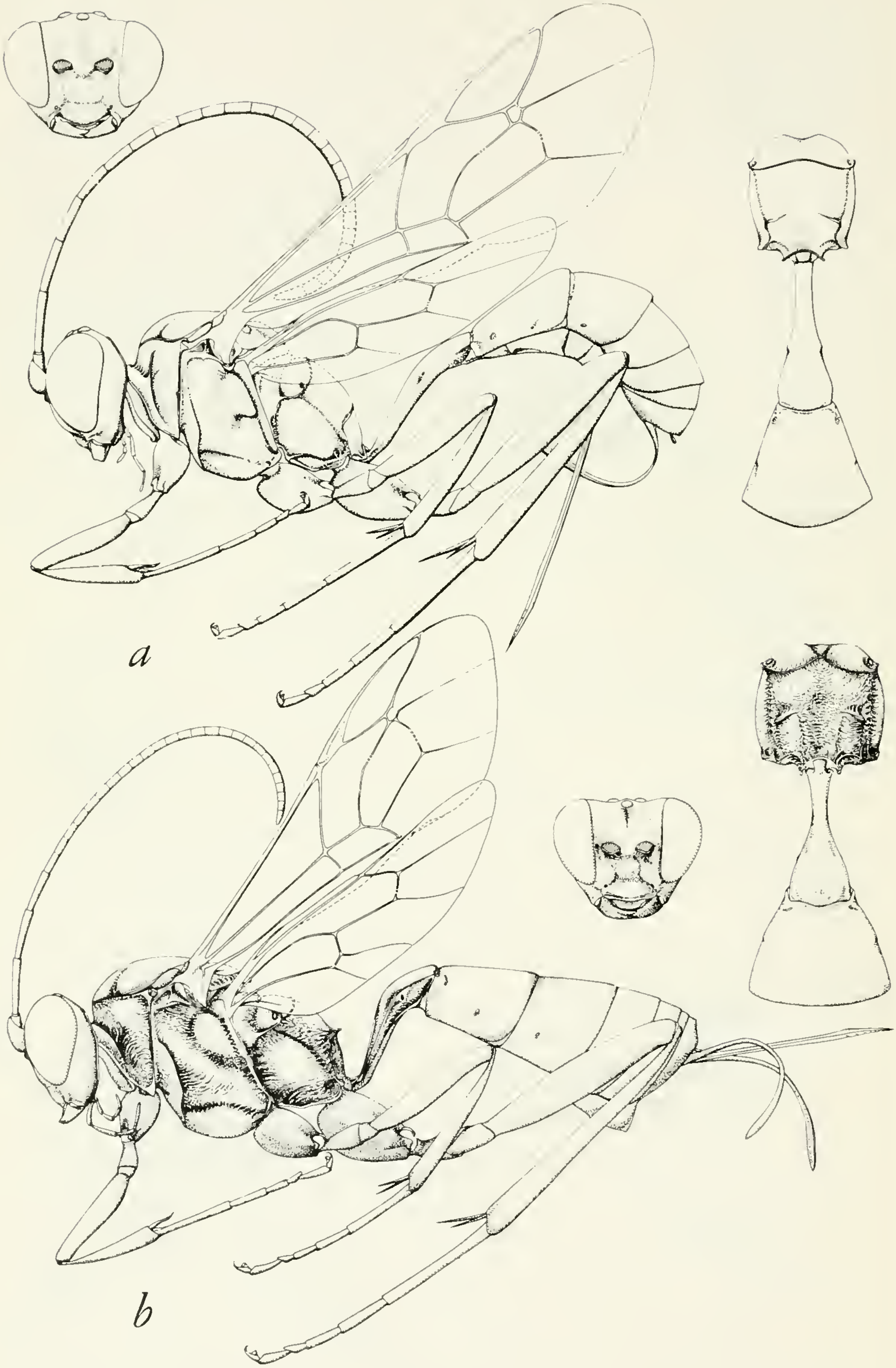


FIGURE 317.—a, *Hemisphragia debilis*, ♀, a typical species of *Hemisphragia;* b, *Diapetimorpha introita*, ♀, genotype of *Diapetimorpha*.

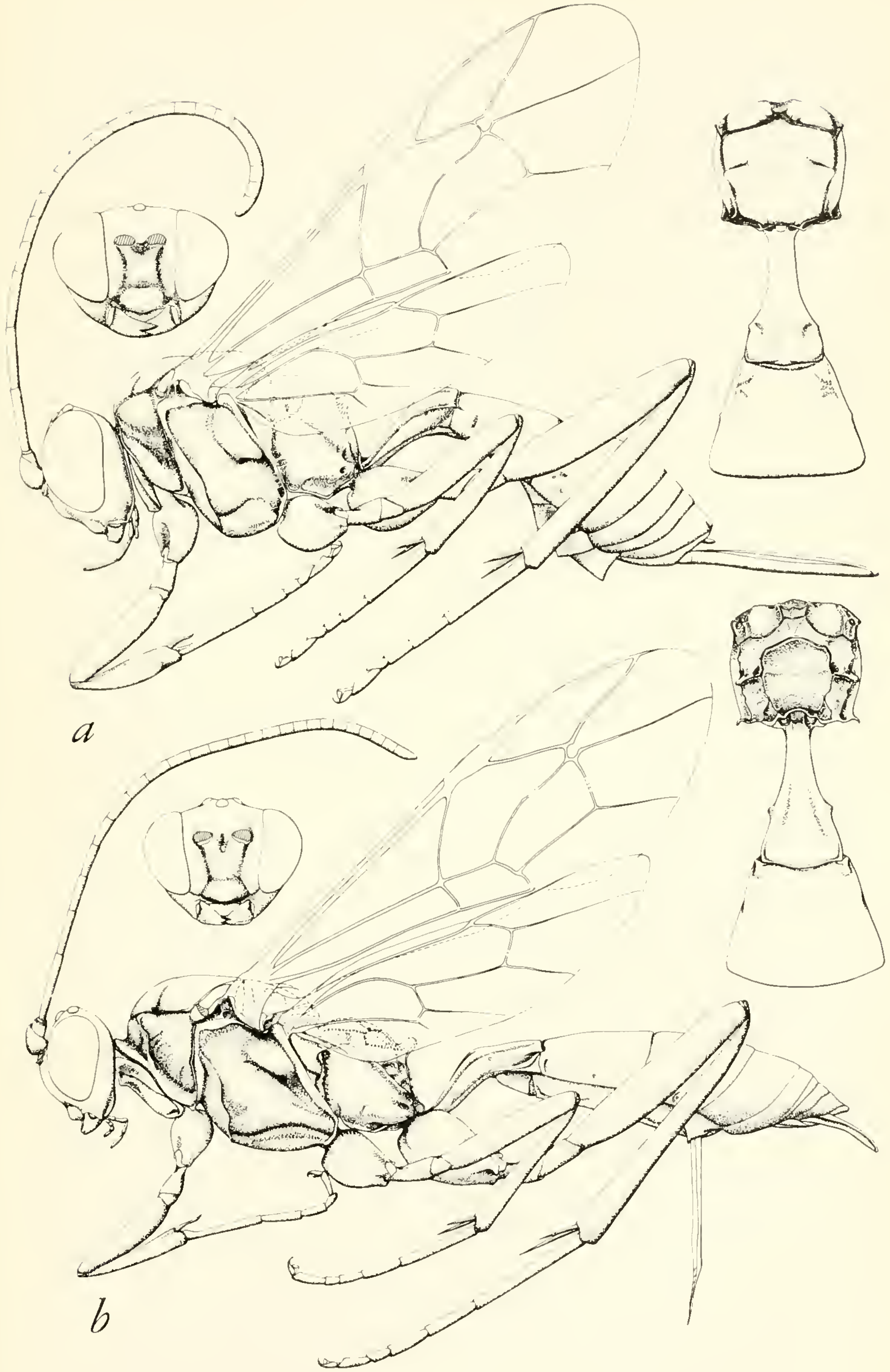


FIGURE 318.—a, *Lymeon orbum*, ♀, genotype of *Lymeon;* b, *Pachysomoides fulvus*, ♀, genotype of the synonym *Polistiphaga*.

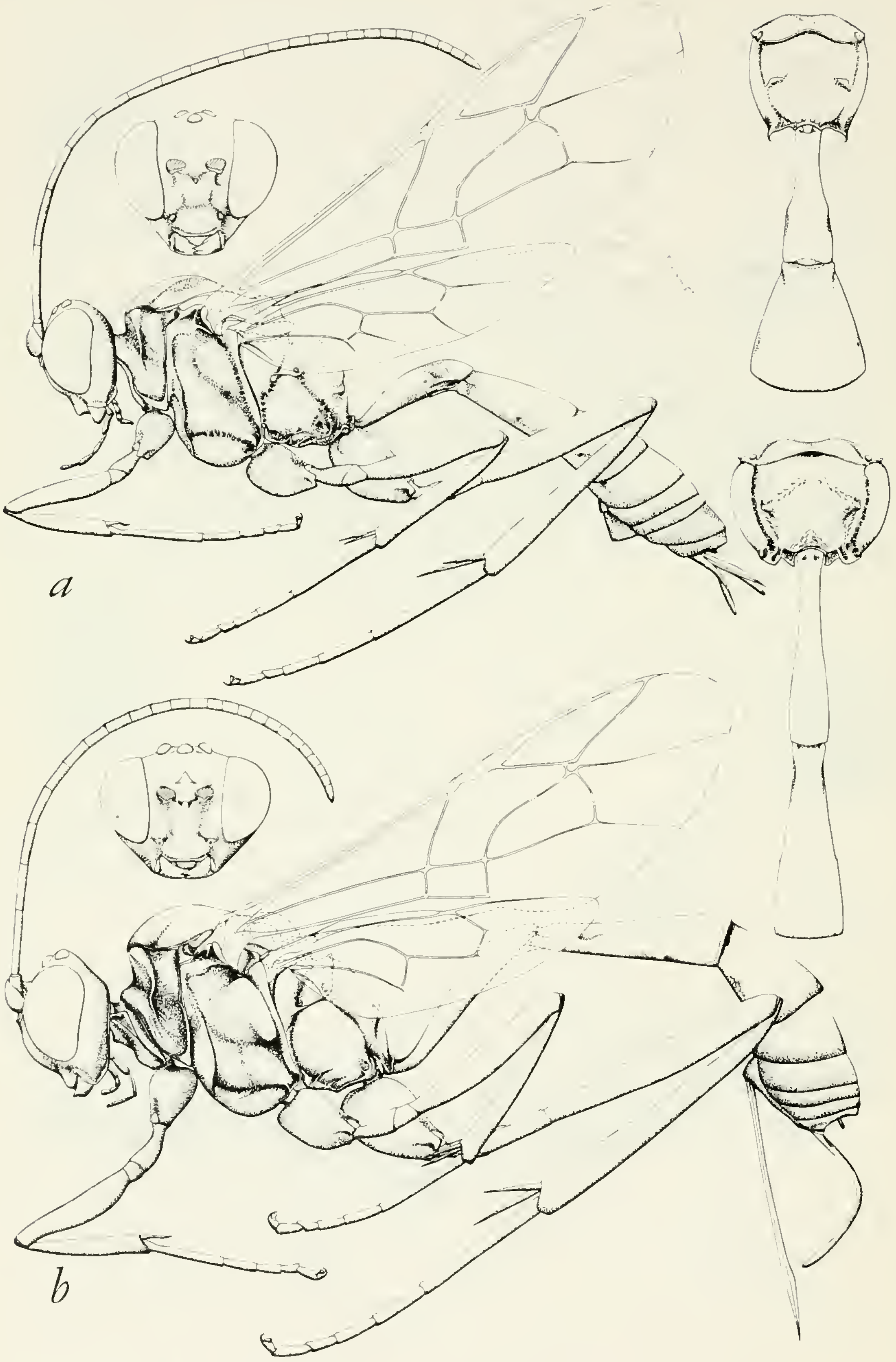


Figure 319.—a, *Acerastes pertinax*, ♀, genotype of *Acerastes;* b, *Polycyrtidea limitis*, ♀, a typical species of *Polycyrtidea.*

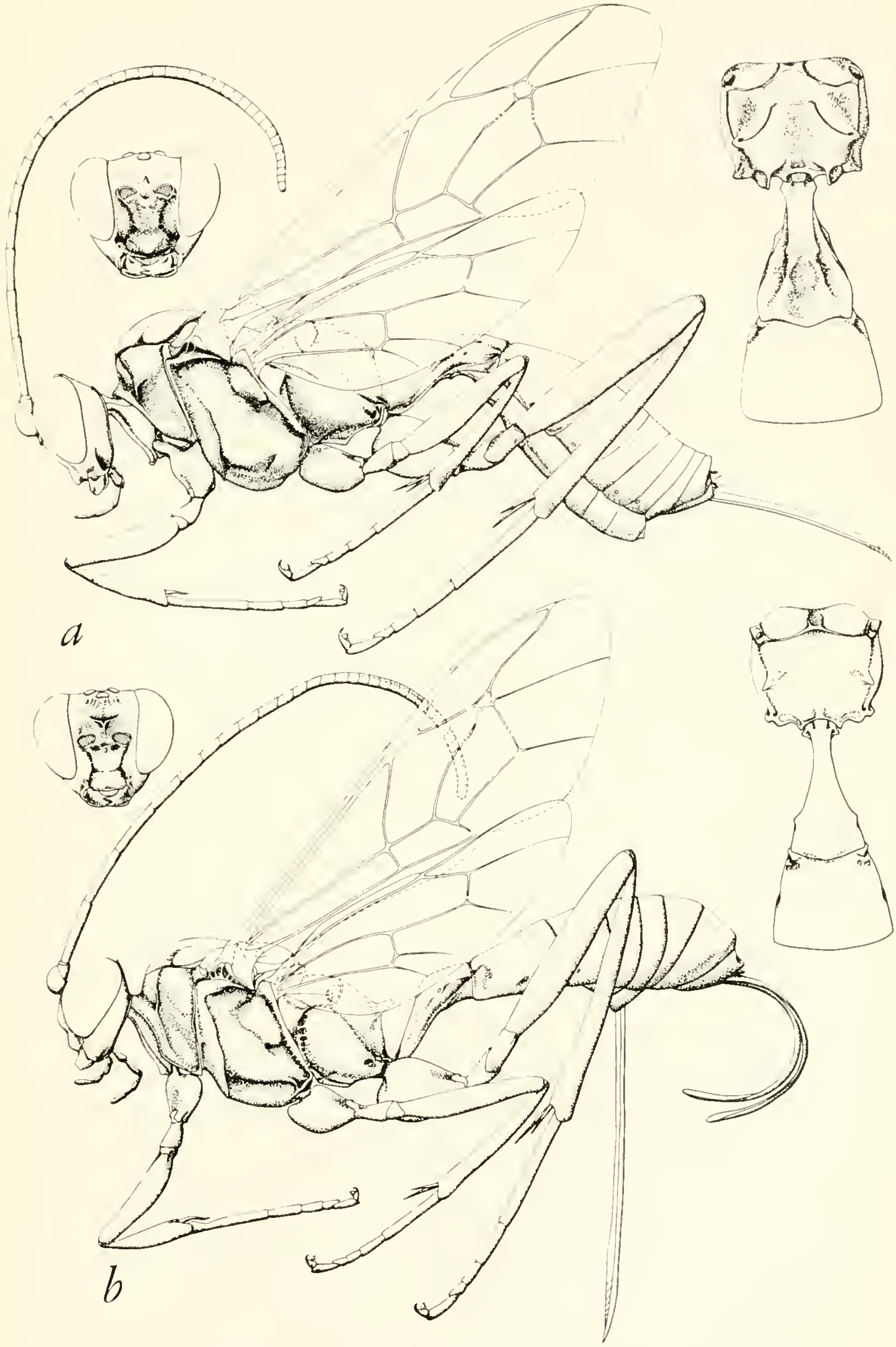


FIGURE 320.—a, *Listrognathus cornuta,* ♀, genotype of *Listrognathus;* b, *Cryptanura banchiformis,* ♀, a typical species of *Cryptanura.*

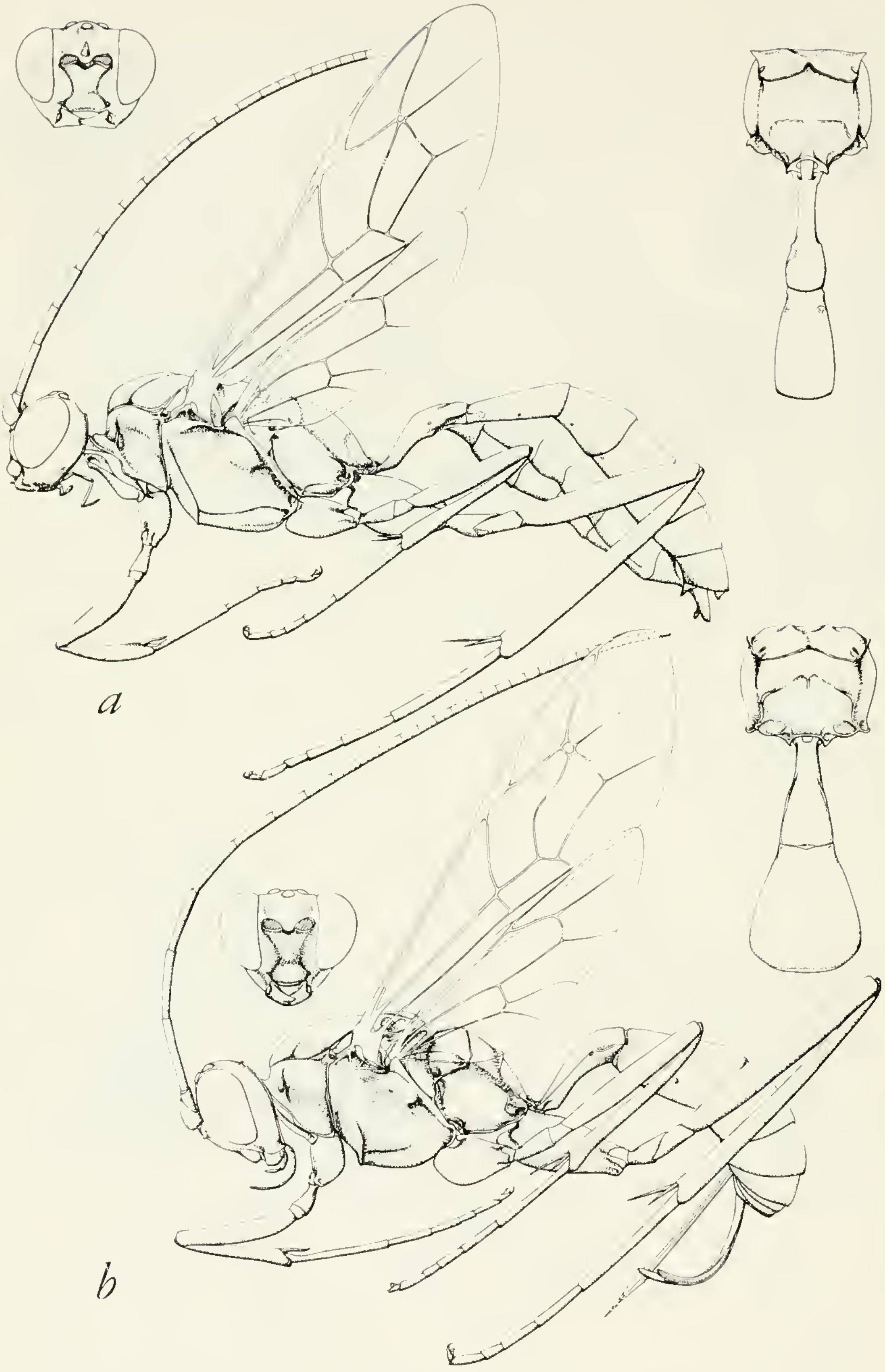


FIGURE 321.—a, *Chamula reliqua*, ♂, genotype of *Chamula;* b, *Camera euryaspis*, ♀, genotype of *Camera*.

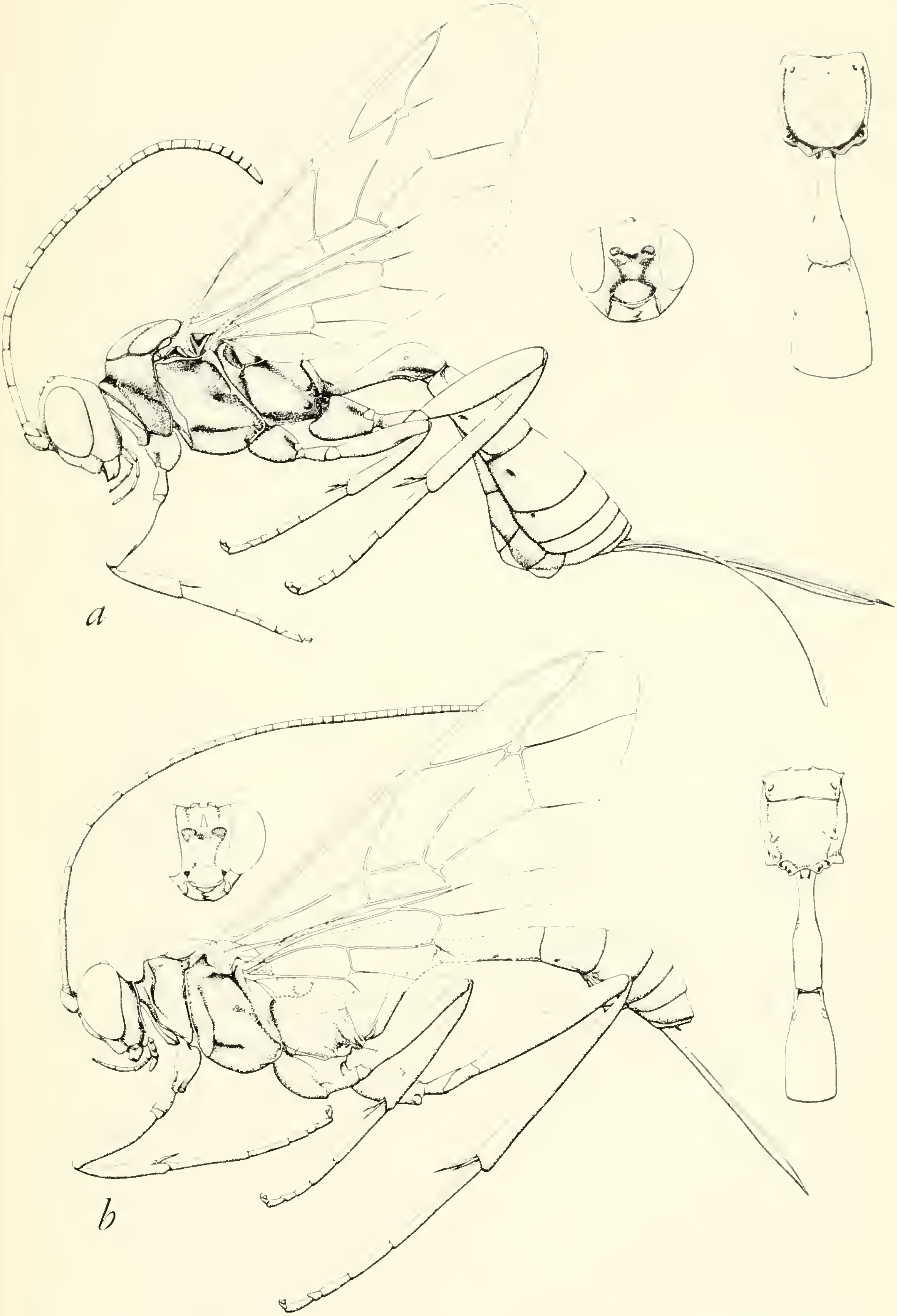


FIGURE 322.—a, *Mesostenus transfuga*, ♀, genotype of *Mesostenus;* b, *Polycyrtus histrio*, ♀, genotype of *Polycyrtus*.

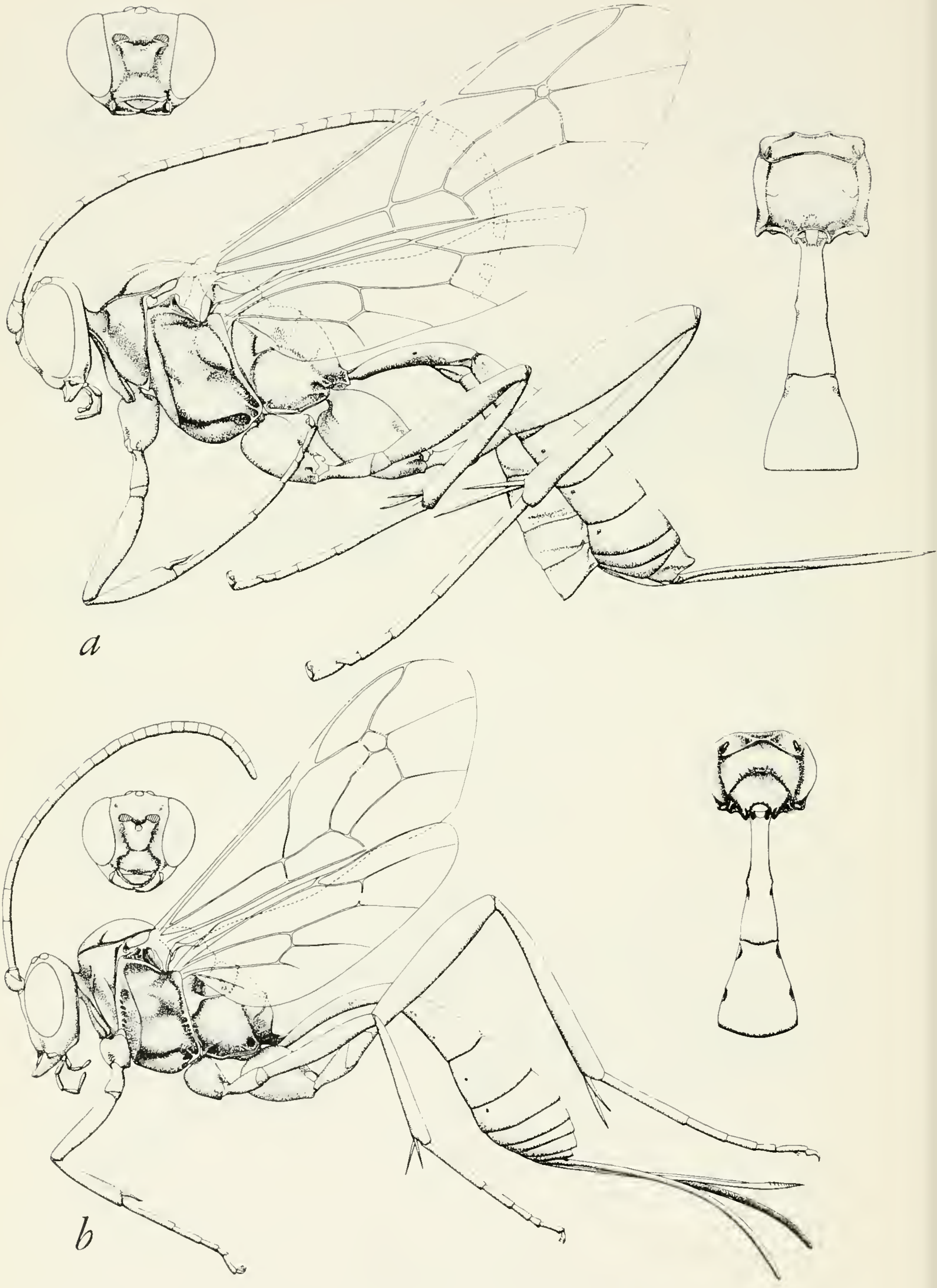


FIGURE 323.—a, *Messatoporus discoidalis*, ♀, genotype of *Messatoporus;* b, *Acroricnus stylator*, ♀, genotype of *Acroricnus*.

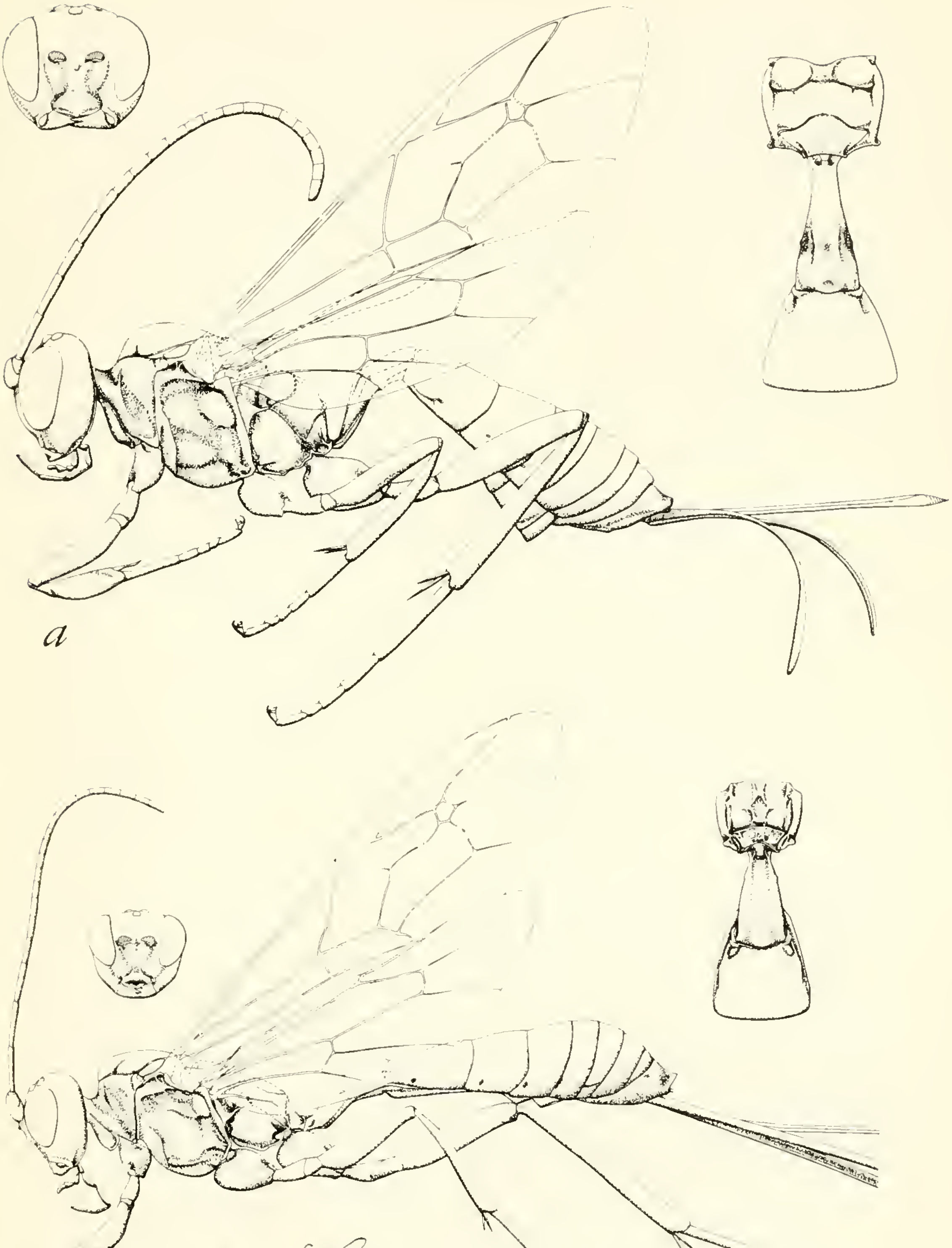


FIGURE 324.—a, *Xylophrurus dispar*, ♀, genotype of *Xylophrurus;* b, *Echthrus reluctator*, ♀, genotype of *Echthrus*.

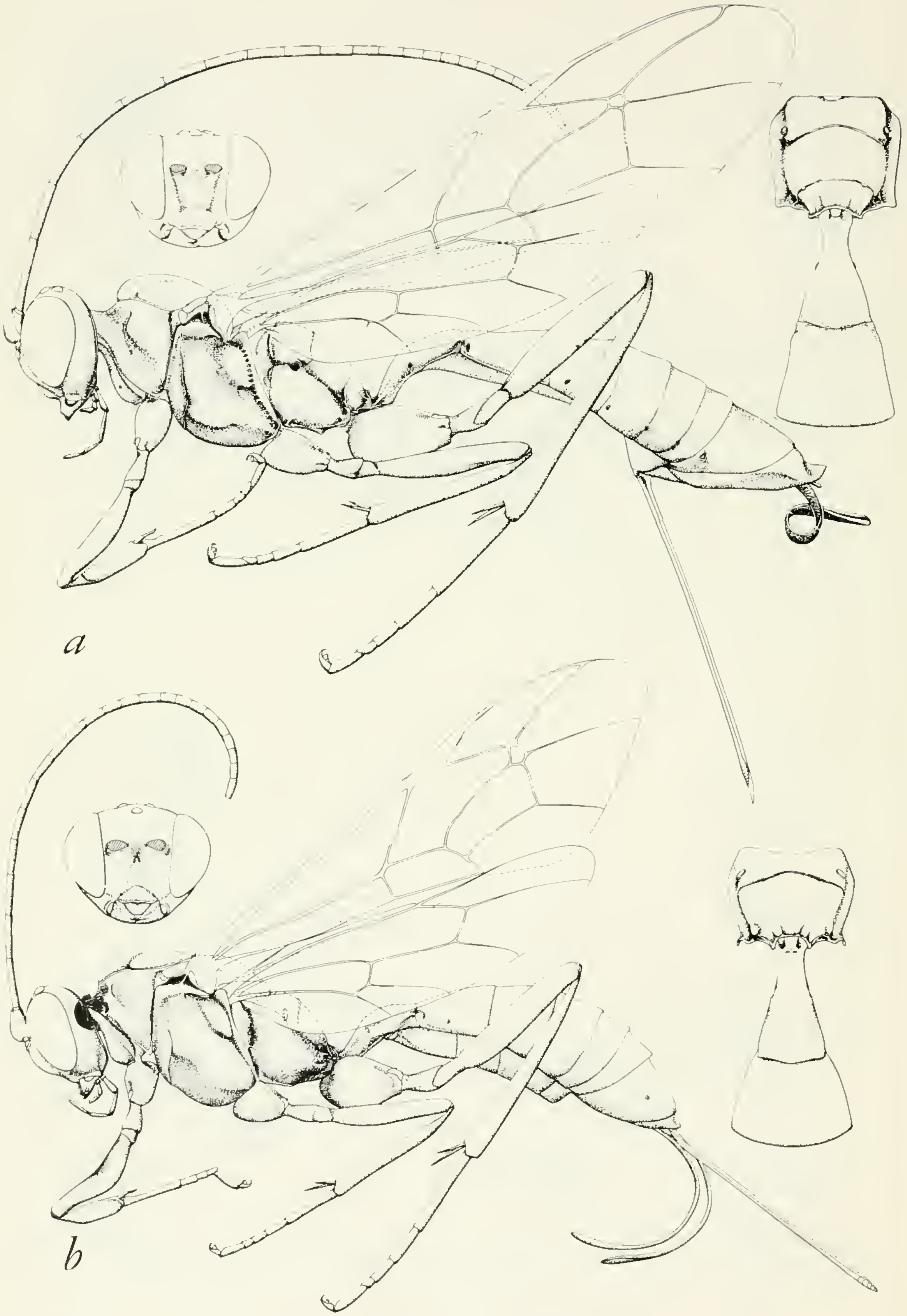


Figure 325.—a, *Agonocryptus discoidaloides*, ♀, genotype of *Agonocryptus;* b, *Cryptohelcostizus alamedensis*, ♀, genotype of *Cryptohelcostizus.*

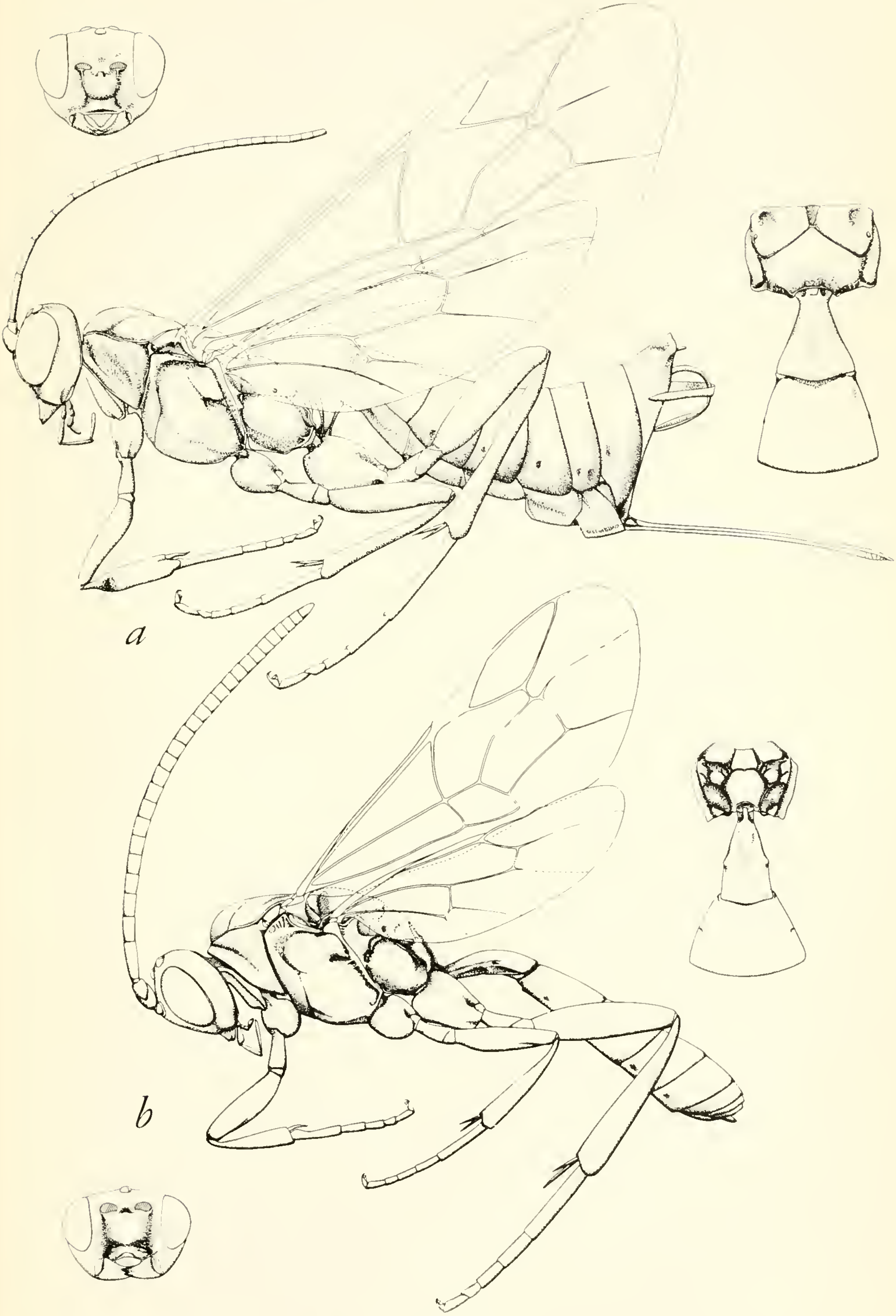


FIGURE 326.—a, *Helcostizus albator*, ♀, genotype of *Helcostizus*; b, *Sphecophaga vesparum*, ♀, genotype of *Sphecophaga* (the drawing is of the overwintering form).

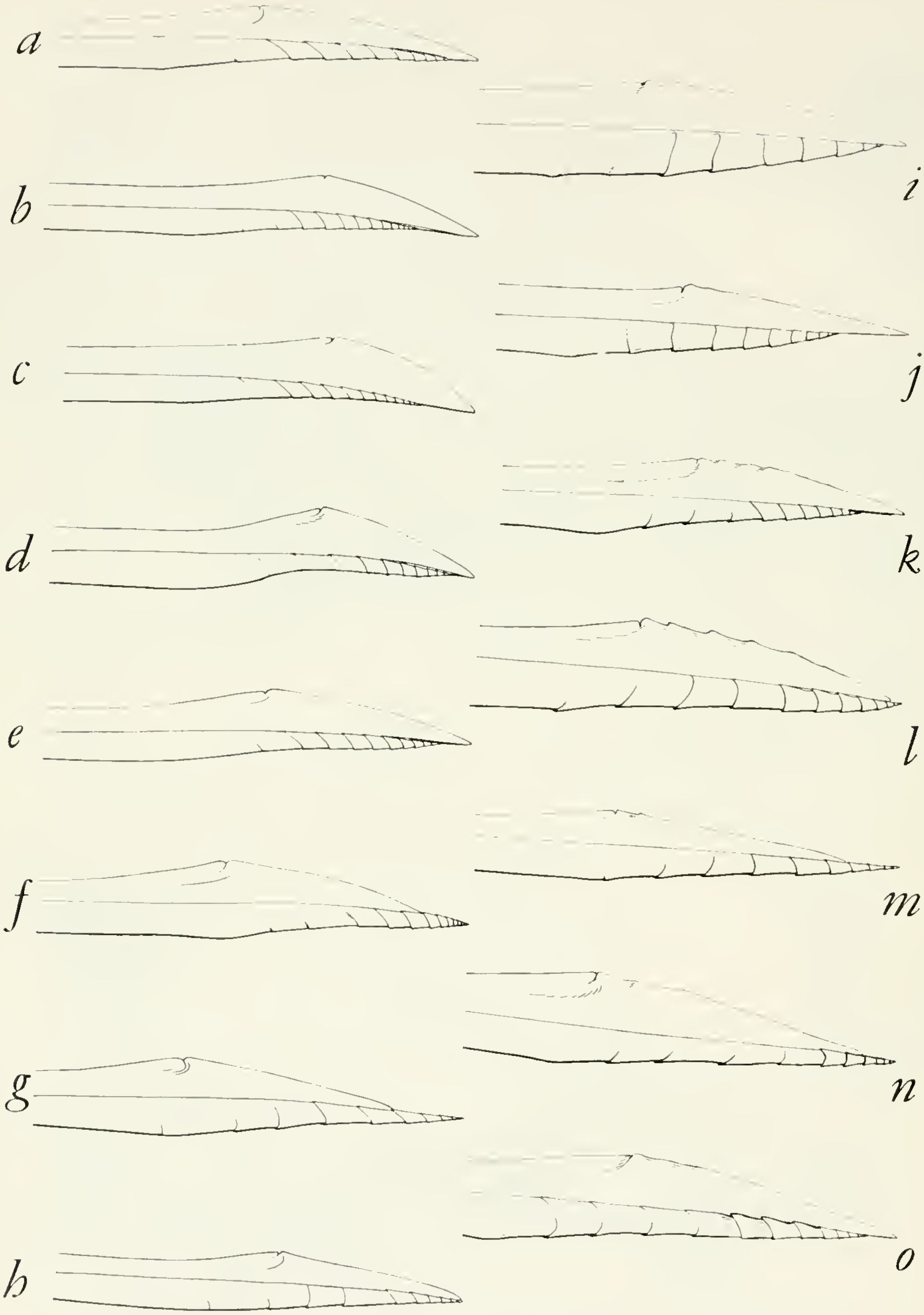


Figure 327.—Ovipositor tips, species of *Agrothereutes* and *Gambrus*.

a, *A. grandis*
b, *A. alutarius*
c, *A. montanus*
d, *A. pallipennis*
e, *A. abbreviator*
f, *A. lophyri*
g, *A. cimbcivorus*
h, *A. mandator*
i, *G. bituminosus*
j, *G. apicatus*
k, *G. ultimus*
l, *G. yukonensis*
m, *G. canadensis*
n, *G. nuncius*
o, *G. extrematis*

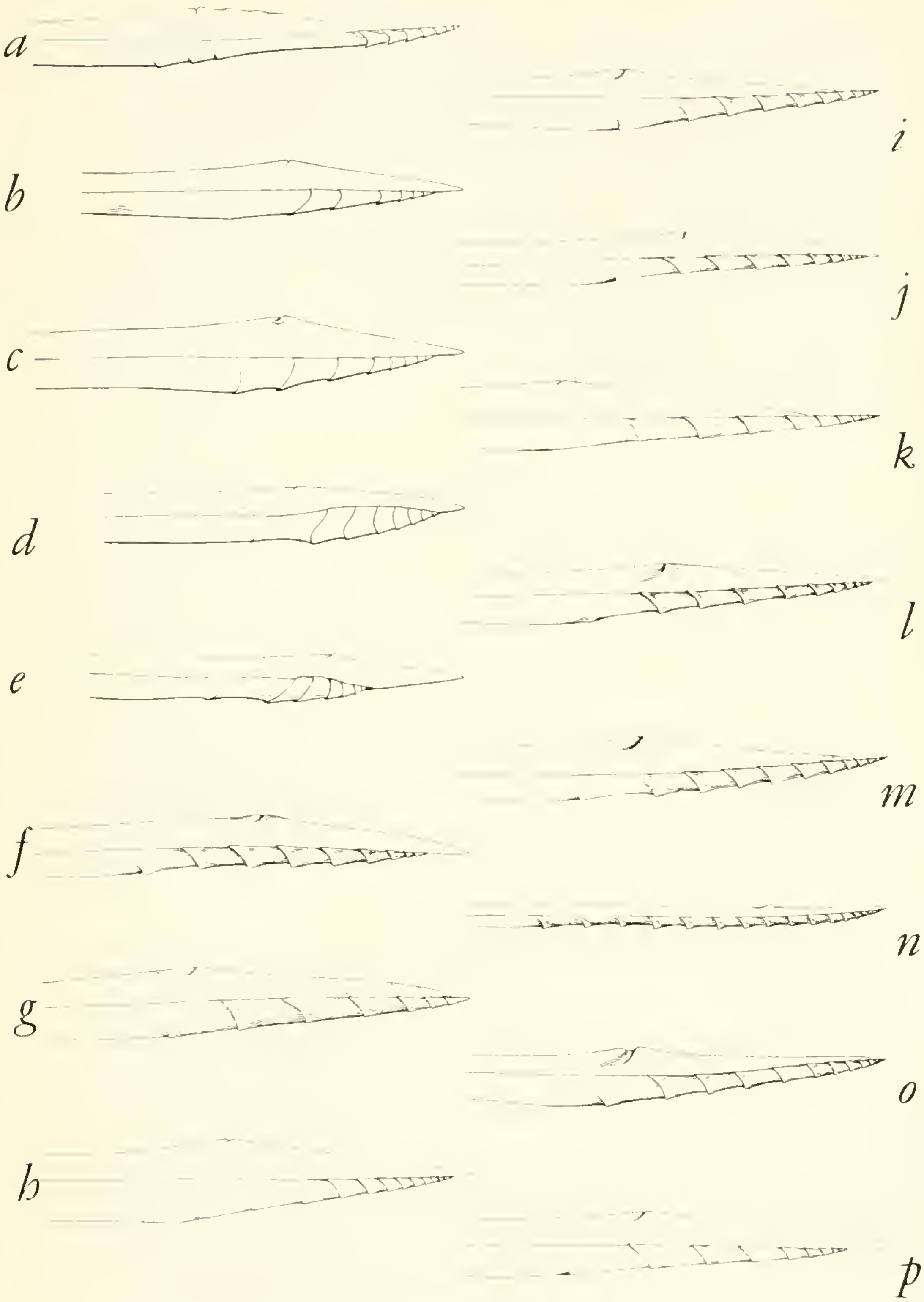


FIGURE 328.—Ovipositor tips, species of *Gambrus*, *Mallochia*, and *Trachysphyrus*.

a, *G. polyphemi*
b, *M. agenioides*
c, *M. strigosa*
d, *M. frontalis*
e, *M. laevis*
f, *T. murorum*
g, *T. genatus*
h, *T. vancouverensis*
i, *T. fasciatus*
j, *T. dirus*
k, *T. tejonensis*
l, *T. relativus*
m, *T. pacificus*
n, *T. serraticaudus*
o, *T. calescens*
p, *T. symmetricus*

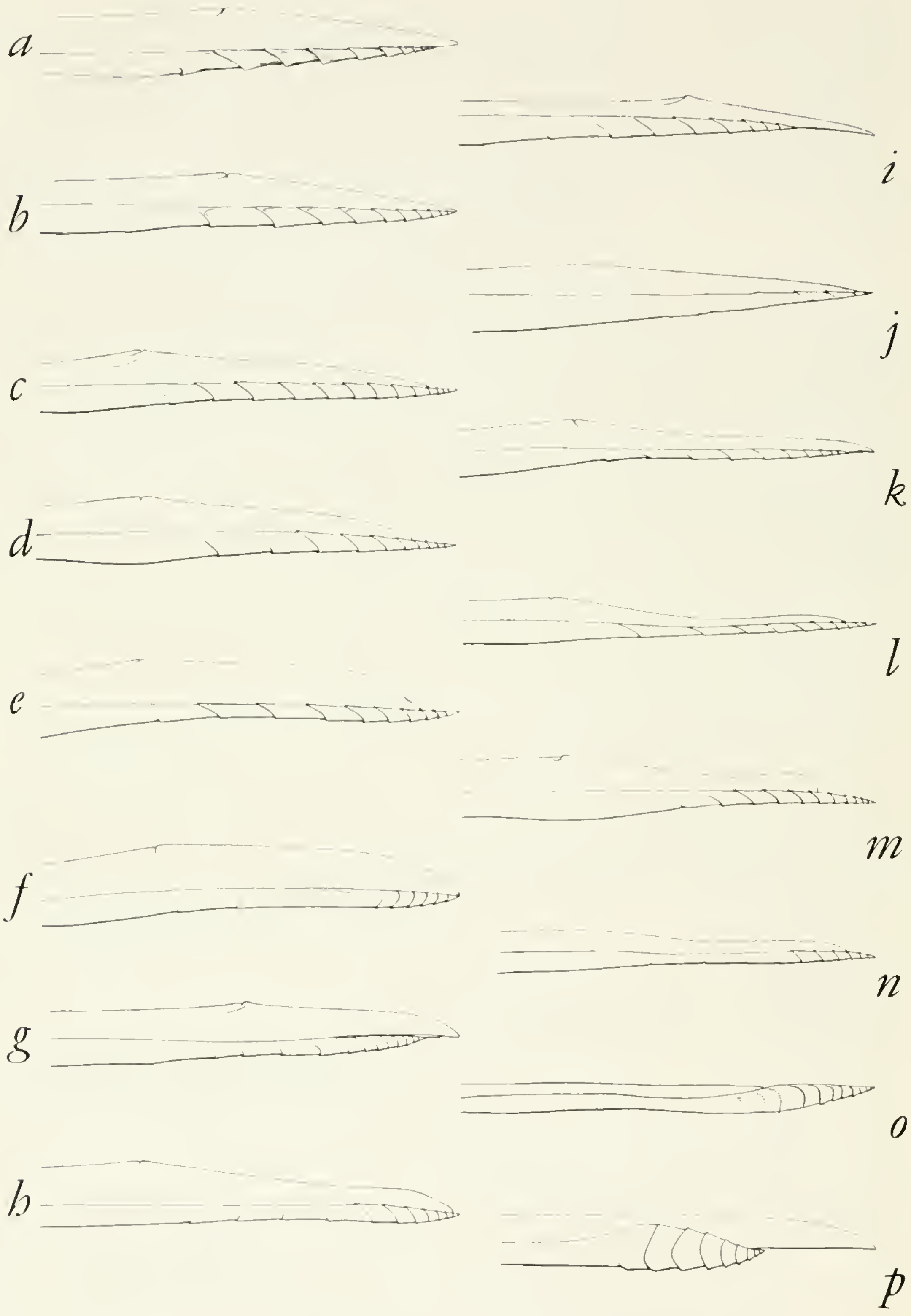


FIGURE 329.—Ovipositor tips:

a, *Trachysphyrus asymmetricus*
b, *Lanugo schlingeri*
c, *Lanugo retentor*
d, *Lanugo deserti*
e, *Lanugo longurius*
f, *Lanugo polita*
g, *Lanugo excincta*
h, *Lanugo sororia*
i, *Listrognathus paludata*
j, *Listrognathus bicolor*
k, *Listrognathus albomaculata*
l, *Listrognathus rufitibialis*
m, *Listrognathus glomerata*
n, *Listrognathus acheloma*
o. *Acroricnus stylator*
p, *Agonocryptus discoidaloides*

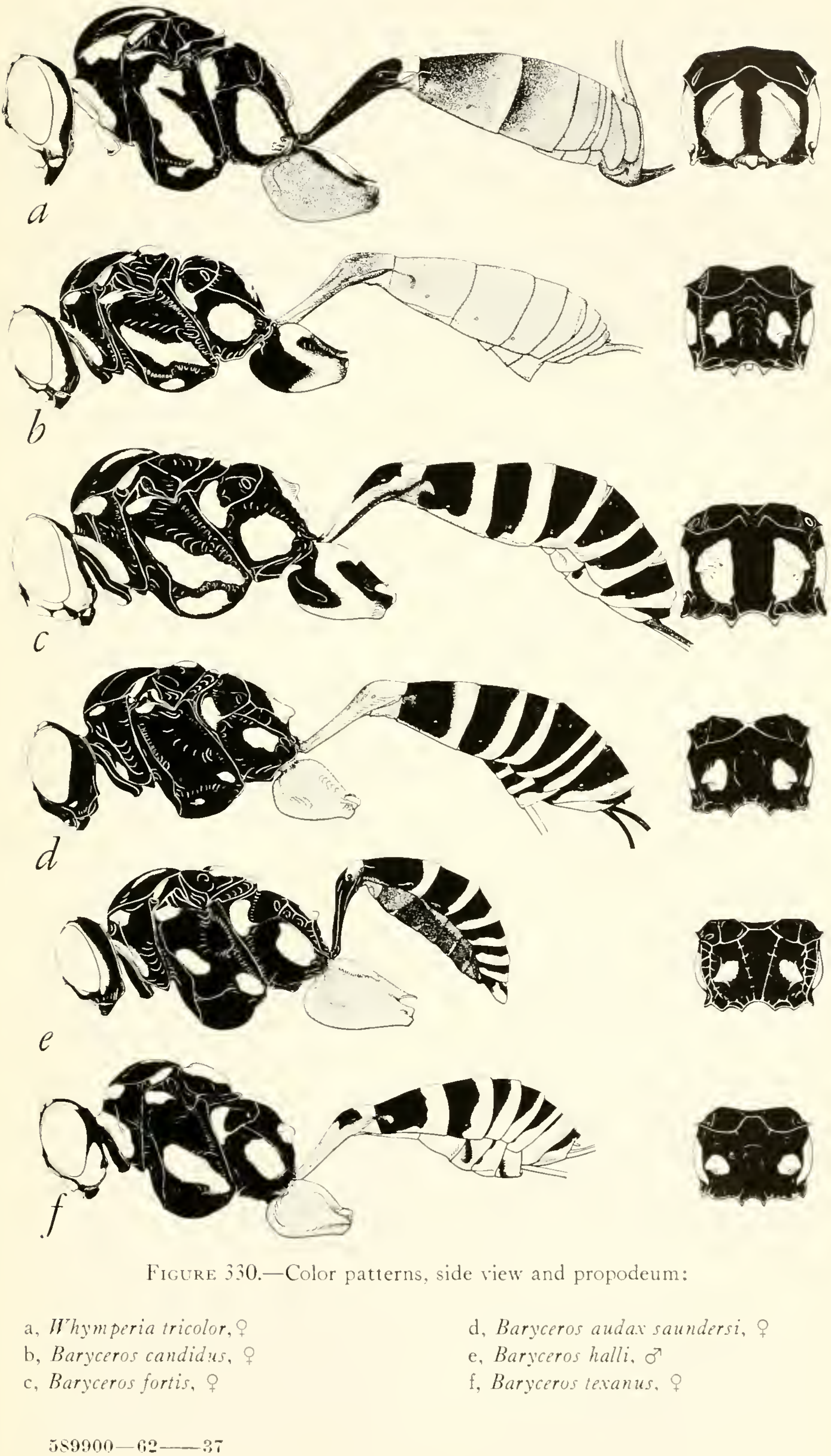


Figure 330.—Color patterns, side view and propodeum:

a, *Whymperia tricolor*, ♀
b, *Baryceros candidus*, ♀
c, *Baryceros fortis*, ♀
d, *Baryceros audax saundersi*, ♀
e, *Baryceros halli*, ♂
f, *Baryceros texanus*, ♀

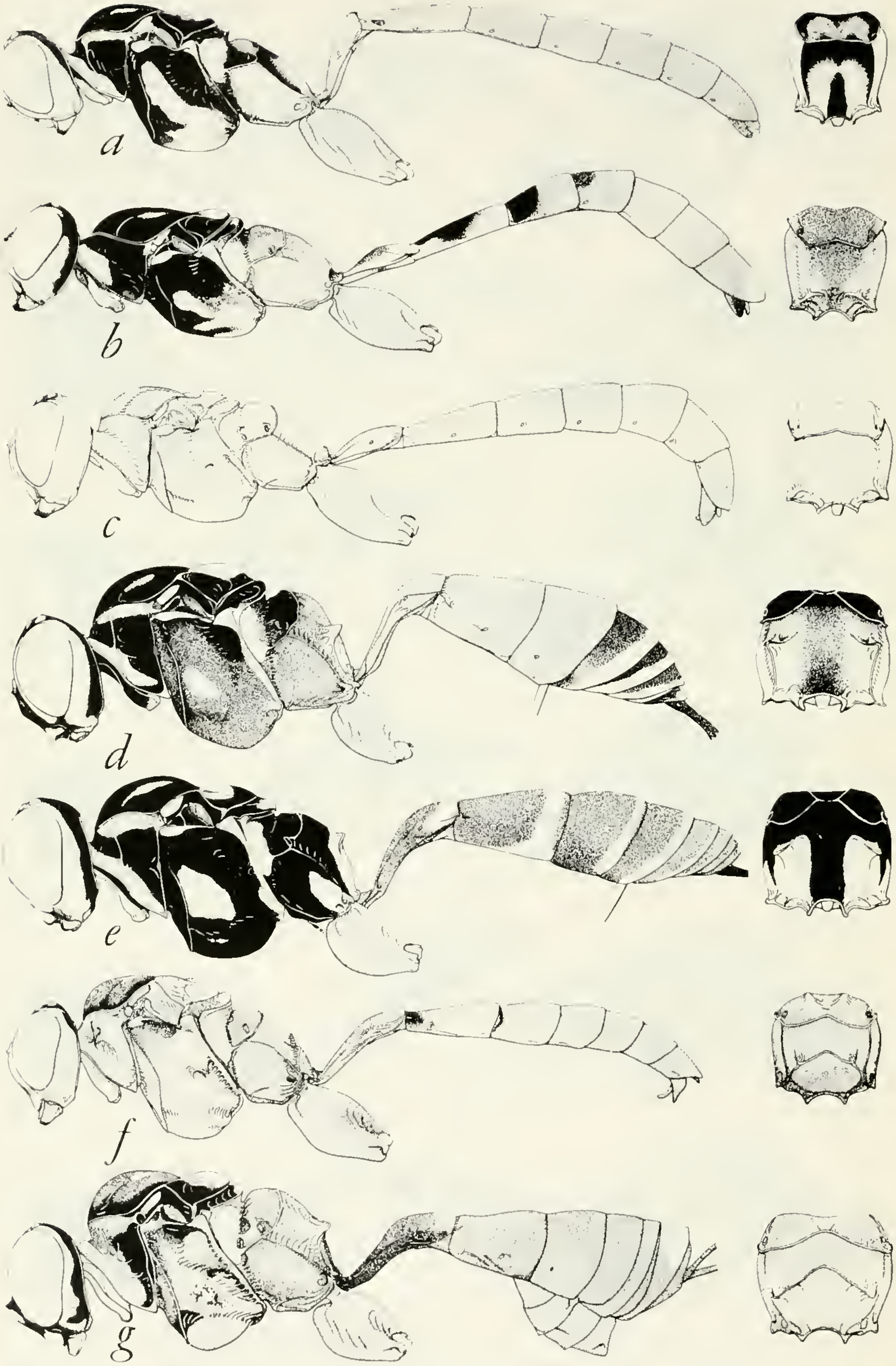


FIGURE 331.—Color patterns, side view and propodeum:

a, *Mallochia agenioides*, ♂
b, *Mallochia frontalis*, ♂
c, *Mallochia laevis*, ♂
d, *Chromocryptus planosae planosae*, ♀
e, *Chromocryptus planosae vandykei*, ♀
f, *Diapetimorpha alabama*, ♂
g, *Diapetimorpha alabama*, ♀

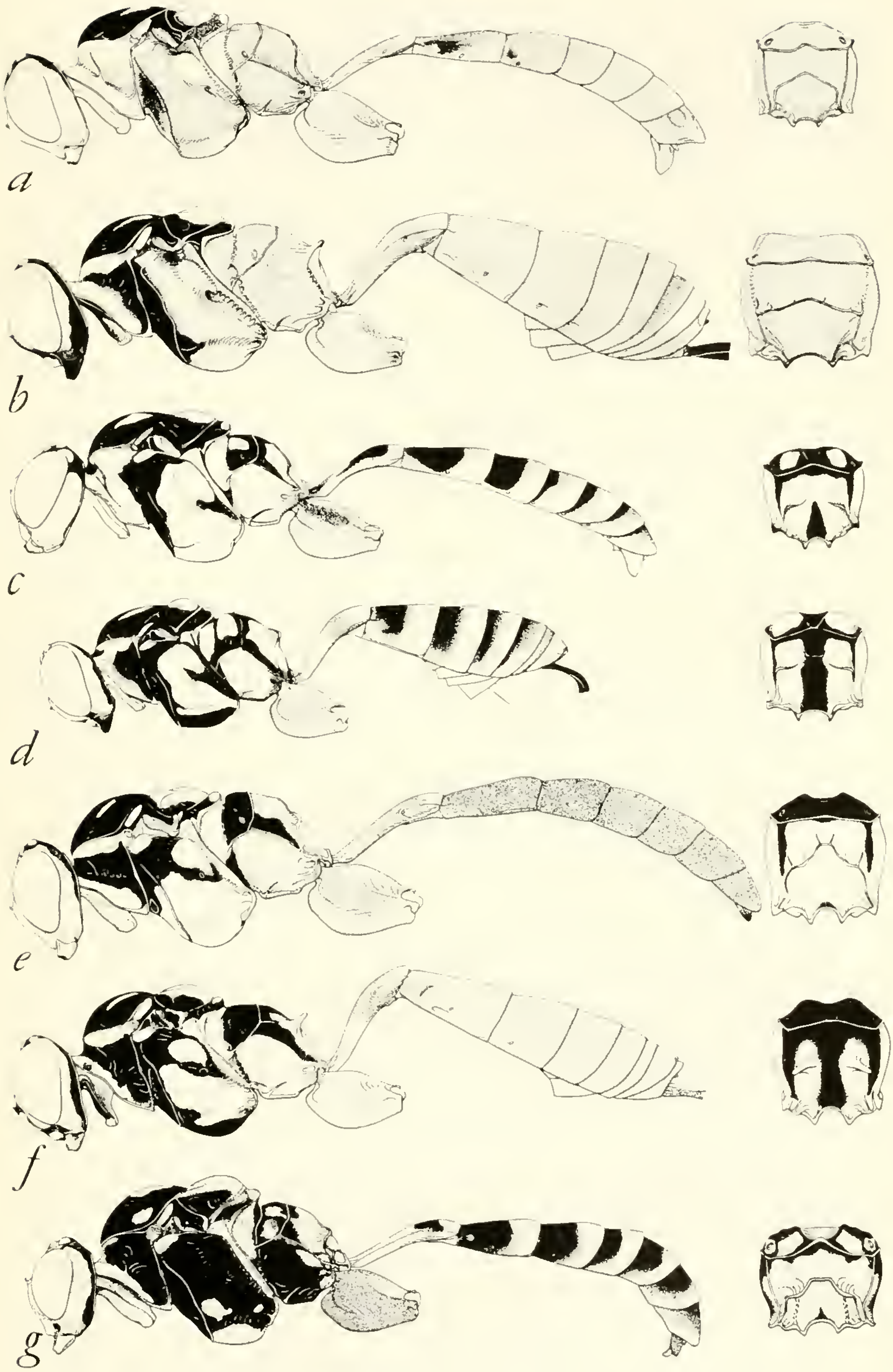


FIGURE 332.—Color patterns, side view and propodeum:

a, *Diapetimorpha macula confederata*, ♂
b, *Diapetimorpha macula confederata*, ♀
c, *Diapetimorpha picta*, ♂
d, *Diapetimorpha picta*, ♀
e, *Diapetimorpha rufigaster*, ♂
f, *Diapetimorpha rufigaster*, ♀
g, *Diapetimorpha introita*, ♂

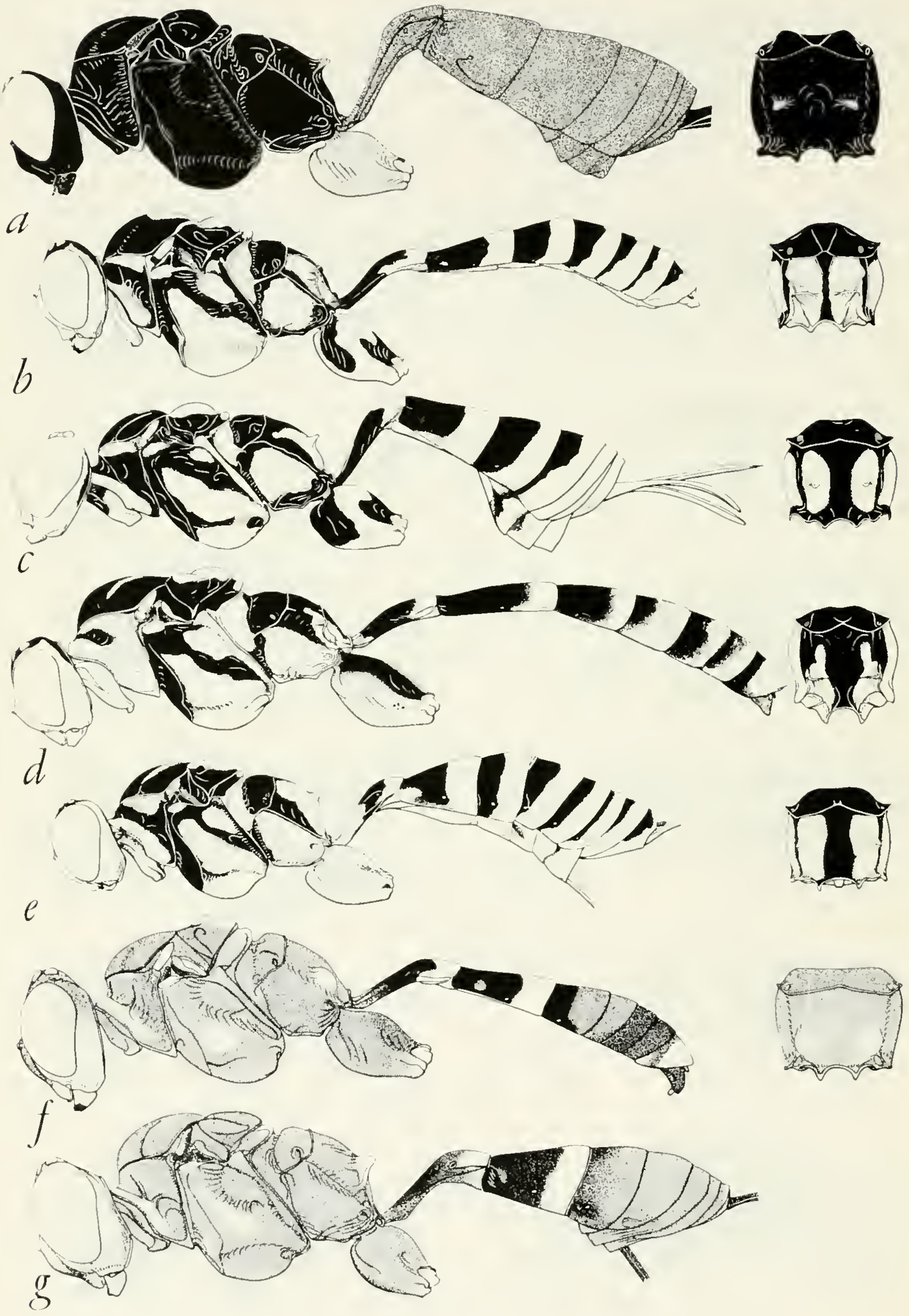


FIGURE 333.—Color patterns, side view and propodeum:

a, *Diapetimorpha introita*, ♀
b, *Lymeon cinctiventris*, ♂
c, *Lymeon cinctiventris*, ♀
d, *Lymeon orbum*, ♂
e, *Lymeon orbum*, ♀
f, *Lymeon leiponeuron*, ♂
g, *Lymeon leiponeuron*, ♀

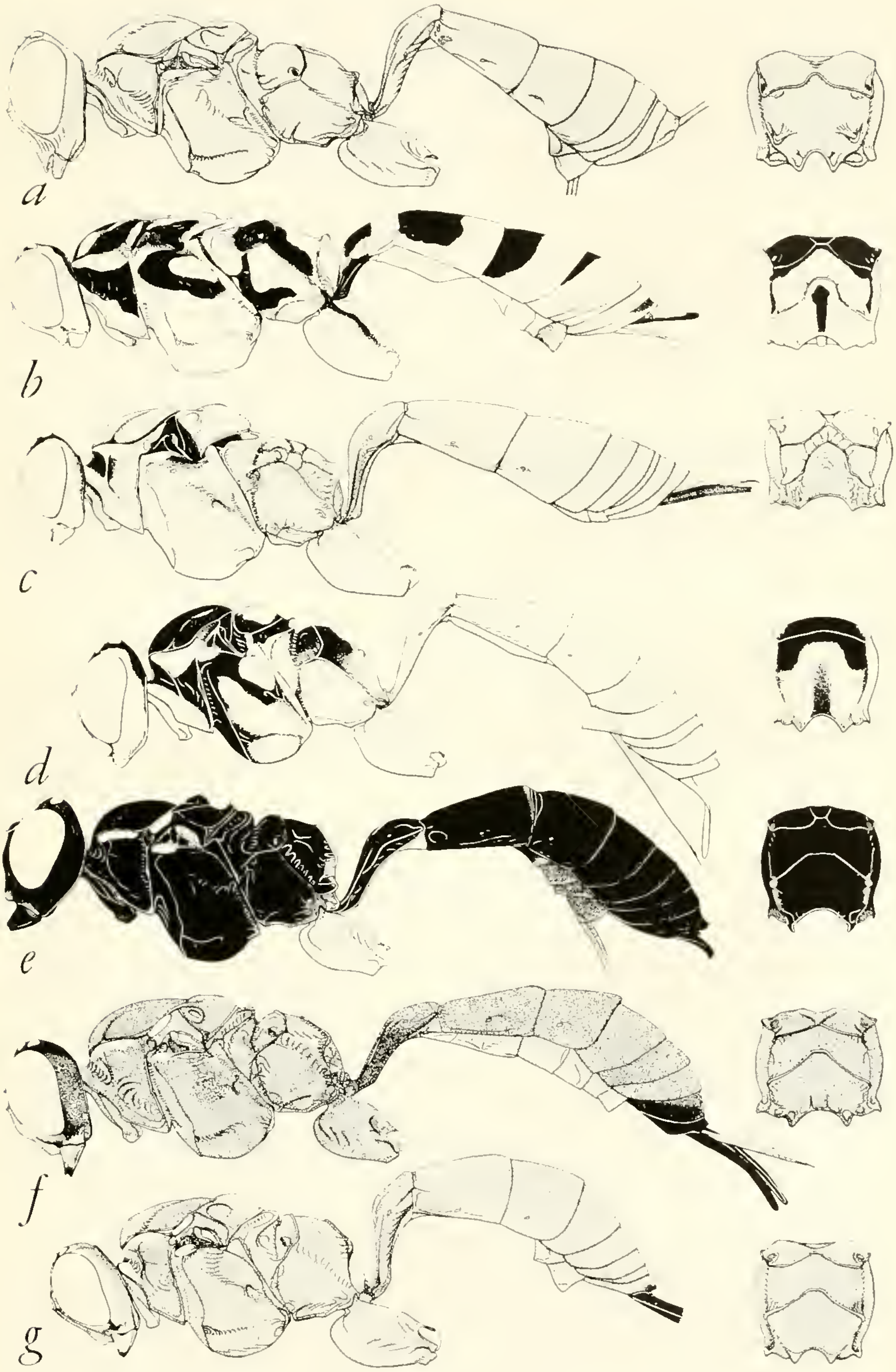


FIGURE 334.—Color patterns, side view and propodeum:

a, *Lymeon nasutum*, ♀
b, *Pachysomoides stupidus*, ♀
c, *Pachysomoides fulvus*, ♀
d, *Acerastes pertinax*, ♀
e, *Listrognathus paludata paludata*, ♀
f, *Listrognathus paludata californica*, ♀
g, *Listrognathus paludata ocularis*, ♀

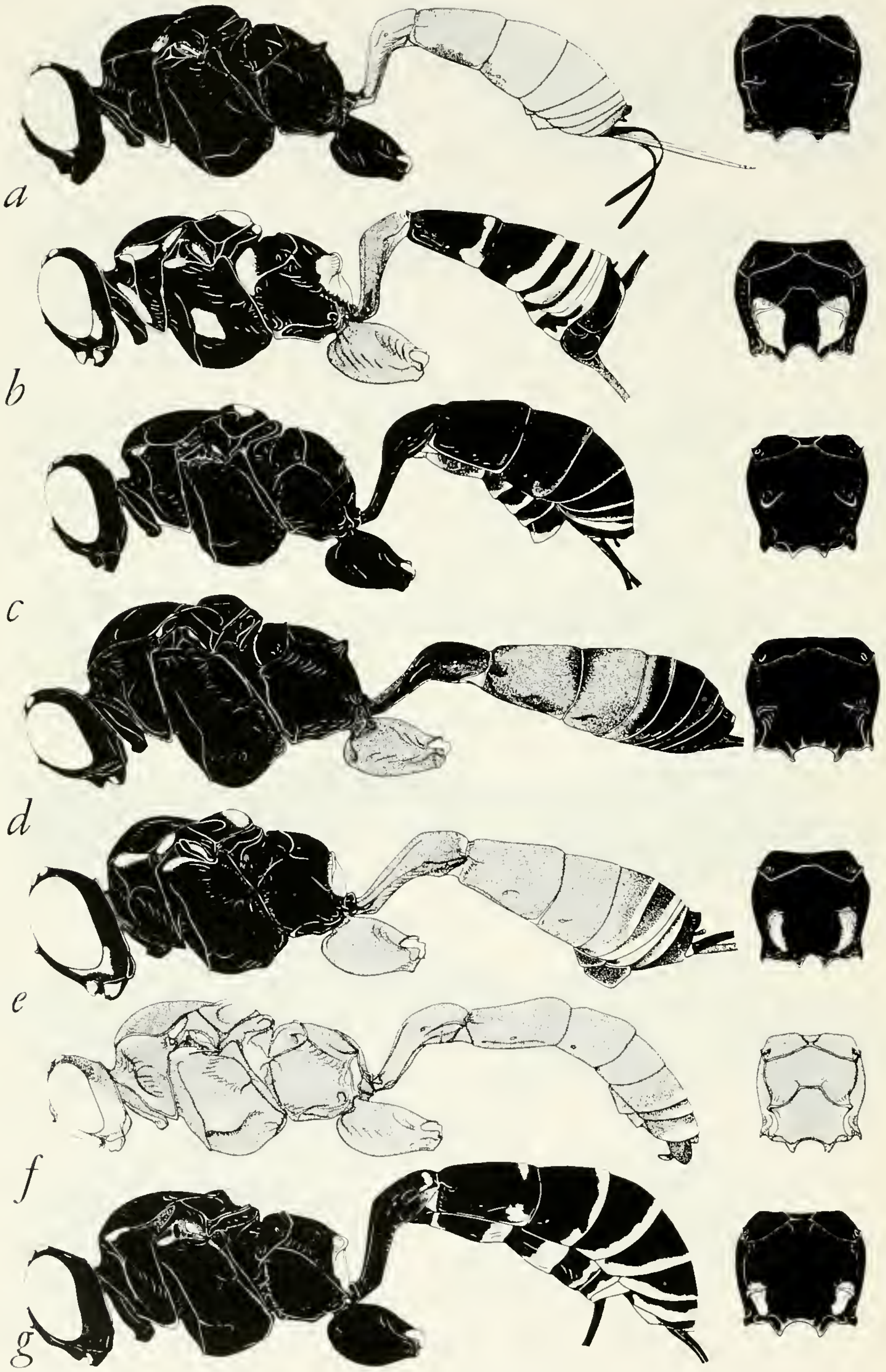


Figure 335.—Color patterns, side view and propodeum:

a, *Listrognathus bicolor*, ♀
b, *Listrognathus femorata*, ♀
c, *Listrognathus nigrescens*, ♀
d, *Listrognathus victoriensis*, ♀
e, *Listrognathus victoriensis*, var., ♀
f, *Listrognathus rufa*, ♂
g, *Listrognathus albomaculata sagax*, ♀

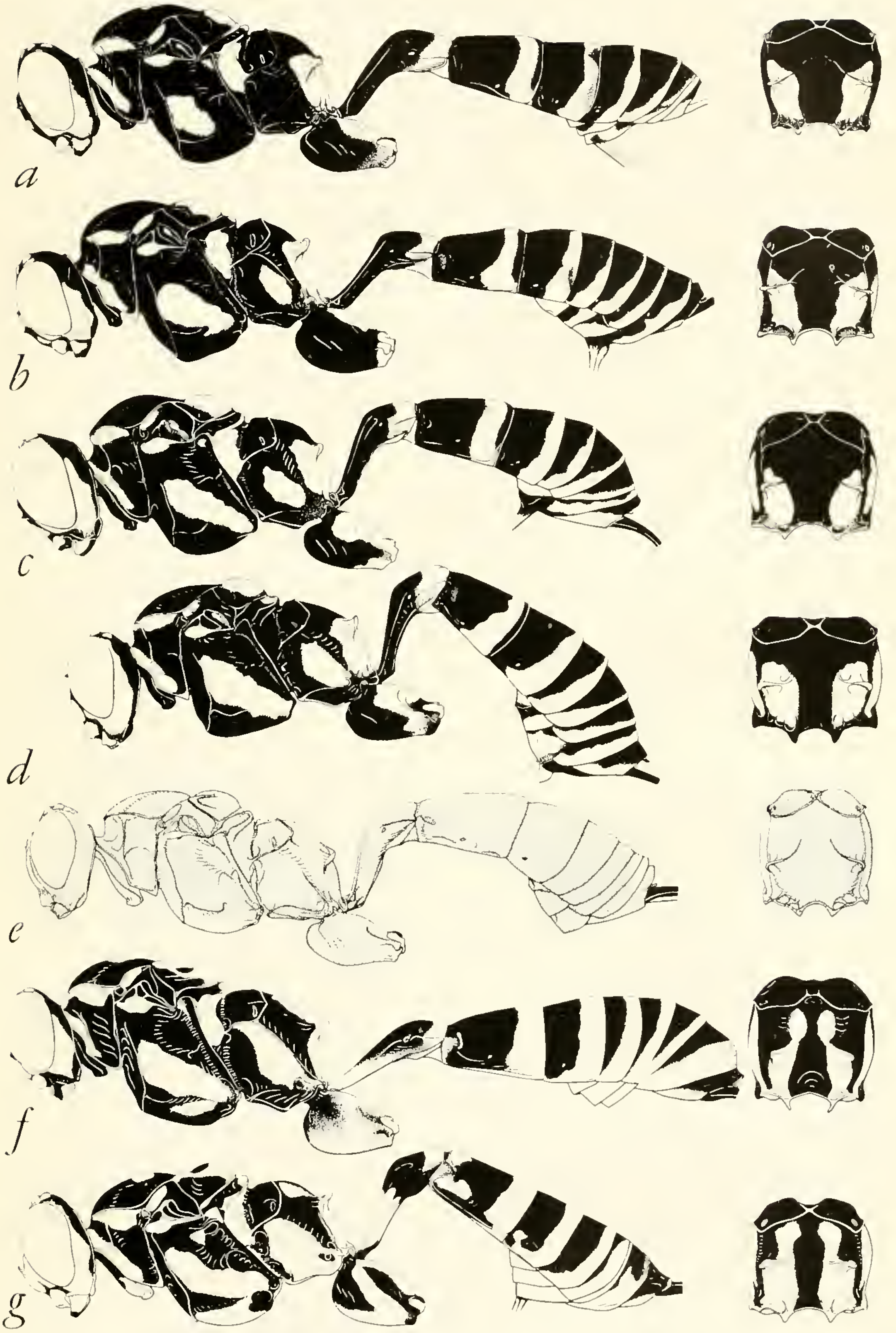


FIGURE 336.—Color patterns, side view and propodeum:

a, *Listrognathus albomaculata albomaculata*, ♀
b, *Listrognathus multimaculata*, ♀
c, *Listrognathus rufitibialis*, ♀
d, *Listrognathus glomerata*, ♀
e, *Listrognathus acheloma*, ♀
f, *Cryptanura banchiformis*, ♀
g, *Cryptanura septentrionalis*, ♀

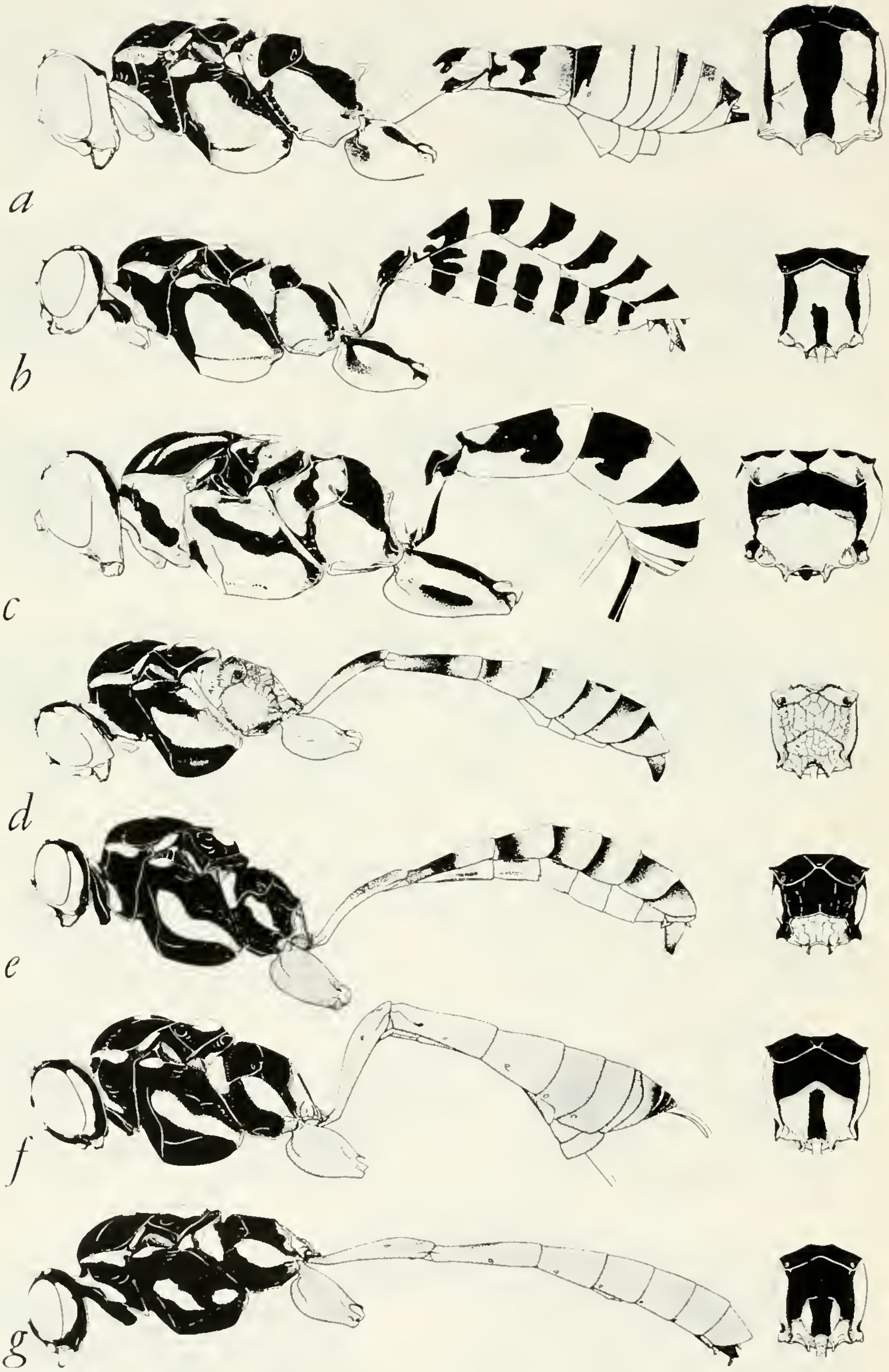


Figure 337.—Color patterns, side view and propodeum:

a, *Cryptanura compacta*, ♀
b, *Chamula reliqua*, ♂
c, *Camera euryaspis*, ♀
d, *Mesostenus eisenii*, ♂
e, *Mesostenus angustus*, ♂
f, *Mesostenus angustus*, ♀
g, *Mesostenus longicaudis*, ♂

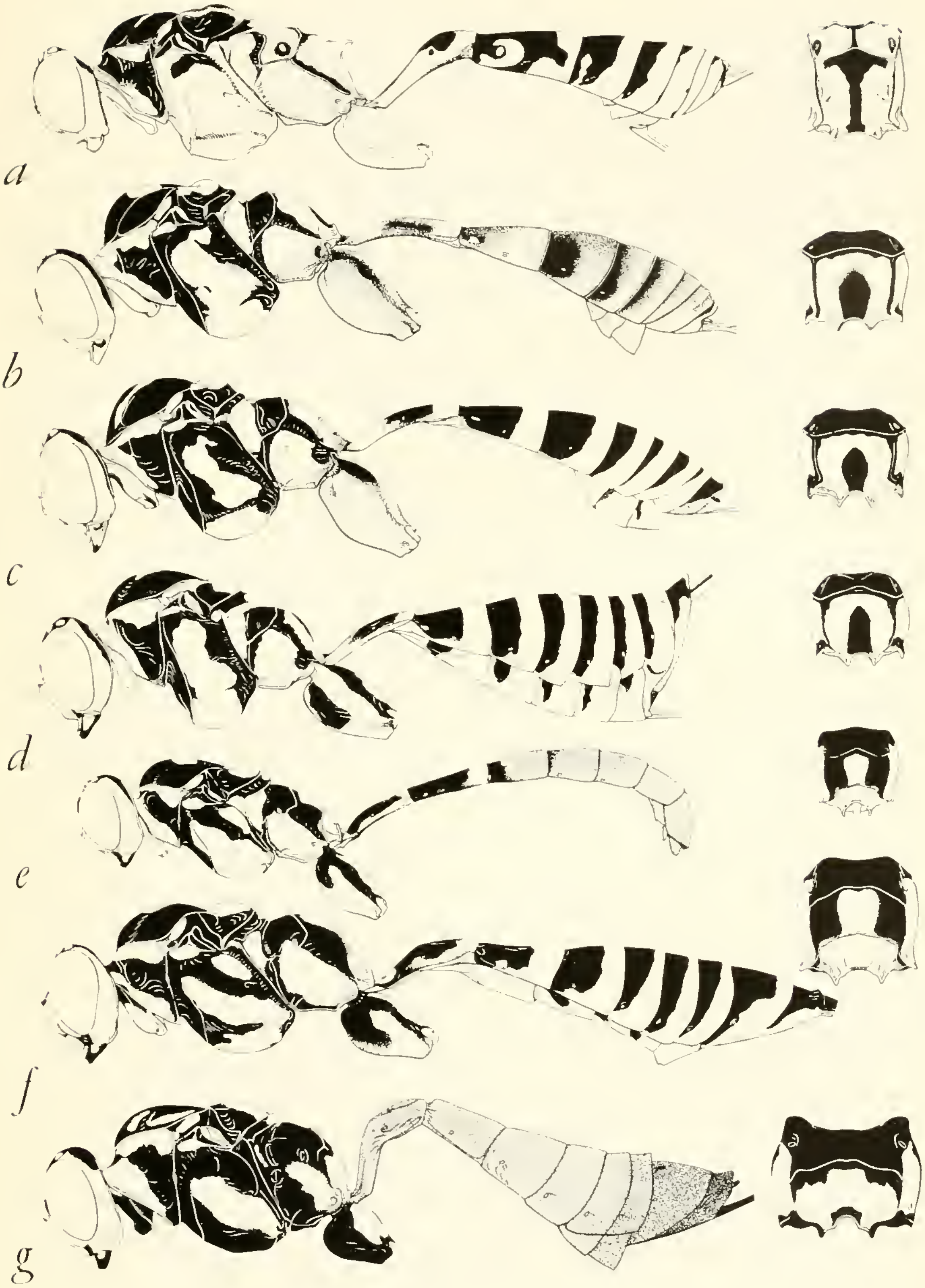
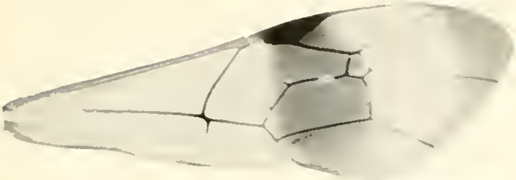


FIGURE 338.—Color patterns, side view and propodeum:

a, *Polycyrtus neglectus*, ♀
b, *Messatoporus rufiventris*, ♀
c, *Messatoporus discoidalis*, ♀
d, *Messatoporus compressicornis*, ♀
e, *Agonocryptus discoidaloides*, ♂
f, *Agonocryptus discoidaloides*, ♀
g, *Cryptohelcostizus maculosus*, ♀

Figures 339–356.—Front wings, species of *Trachysphyrus* and *Lanugo:*

339, *T. fasciatus*, ♀
340, *L. schlingeri*, ♀
341, *L. cestus*, ♀
342, *L. ferrugata*, ♀
343, *L. retentor*, ♀
344, *L. picta*, ♂
345, *L. picta*, ♀
346, *L. deserti*, ♂
347, *L. deserti*, ♀
348, *L. longurius*, ♀
349, *L. bicincta*, ♀
350, *L. polita*, ♀
351, *L. flavipennis*, ♂
352, *L. excincta*, ♂
353, *L. excincta*, ♀
354, *L. sororia*, ♂
355, *L. sororia*, ♀
356, *L. brunnipennis*, ♀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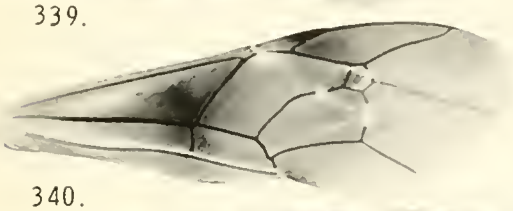
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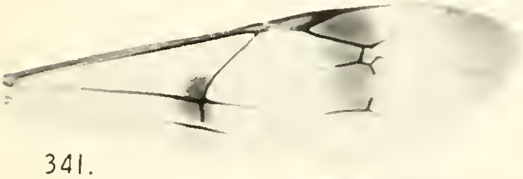
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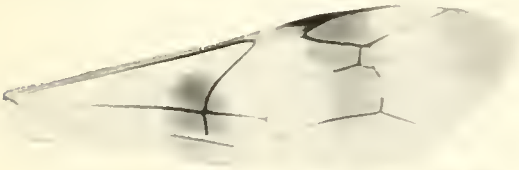
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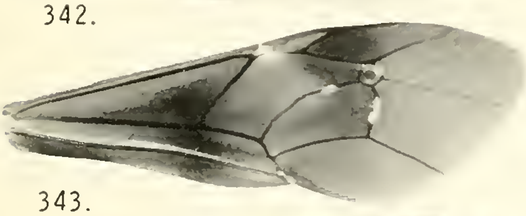
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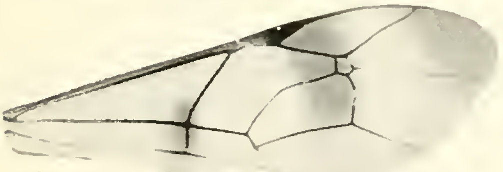
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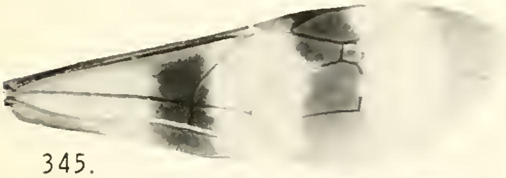
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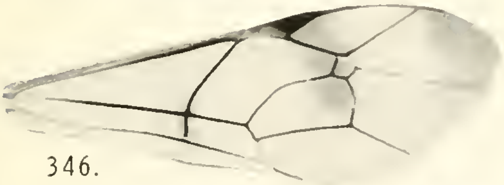
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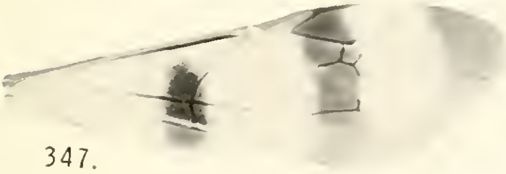
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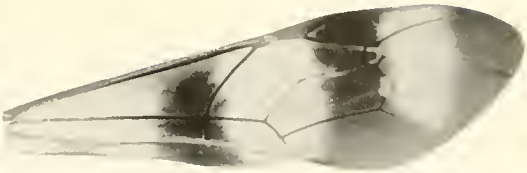
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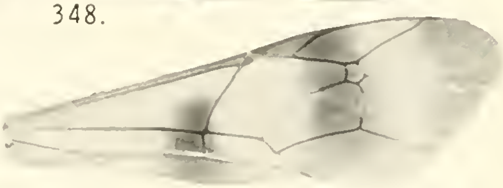
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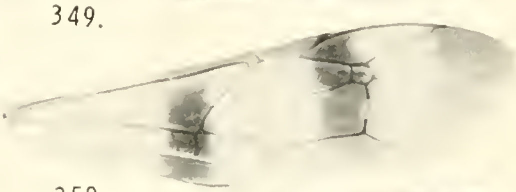
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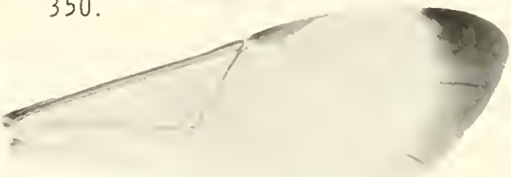
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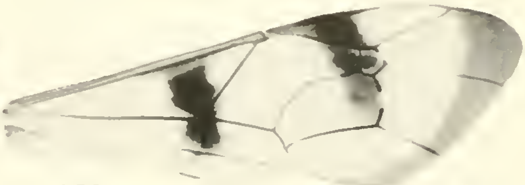
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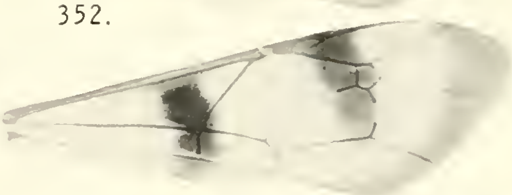
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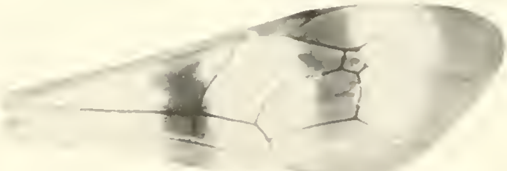
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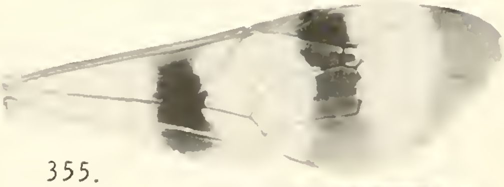
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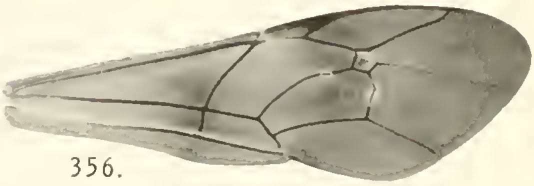
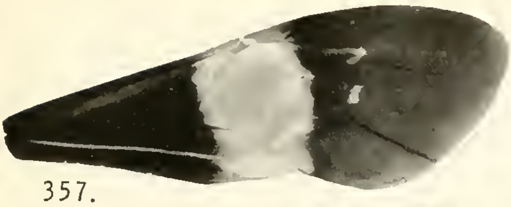

356.

[For explanation see opposite page.]

FIGURES 357–373.—Front wings, species of *Compsocryptus:*

357, *fasciipennis*, ♀
358, *texensis*, ♀
359, *calipterus calipterus*, ♀
360, *calipterus brevicornis*, ♀
361, *aridus*, ♀
362, *apicalis*, ♀
363, *crotchii*, ♀
364, *pallens*, ♀
365, *buccatus*, ♀
366, *tricinctus*, ♀
367, *unicolor*, ♀
368, *turbatus*, ♀
369, *purpuripennis*, ♀
370, *resolutus subfasciatus*, ♂
371, *resolutus subfasciatus*, ♀
372, *resolutus resolutus*, ♂
373, *resolutus resolutus*, ♀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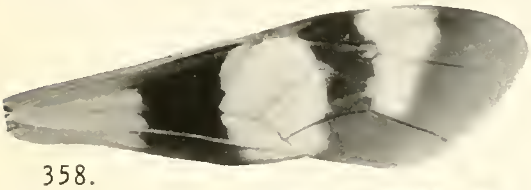
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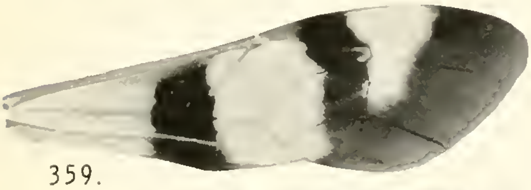
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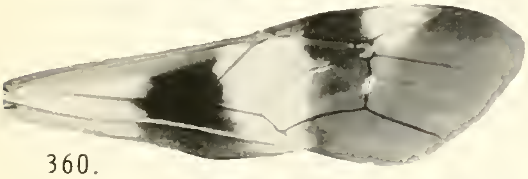
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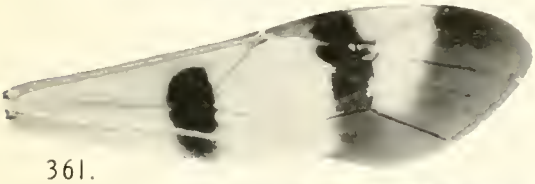
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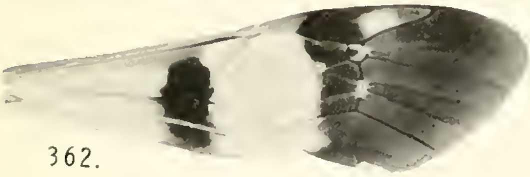
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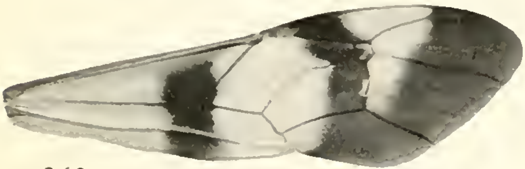
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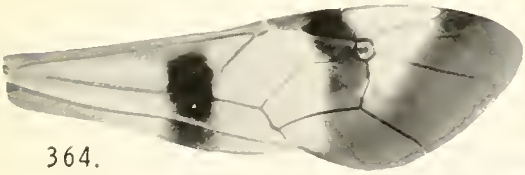
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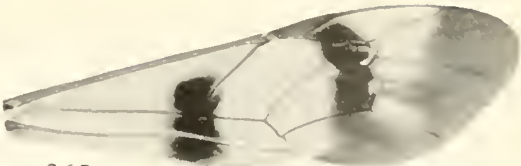
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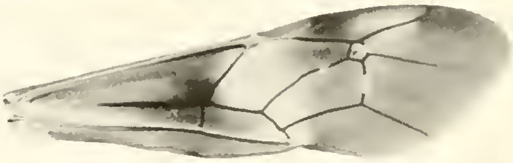
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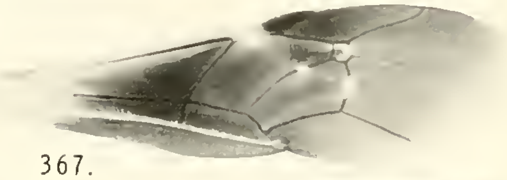
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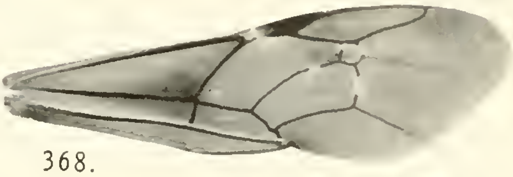
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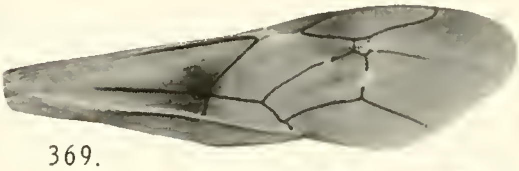
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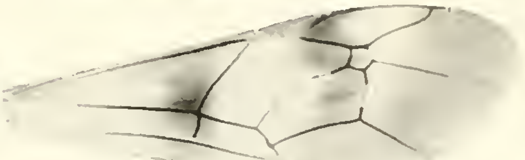
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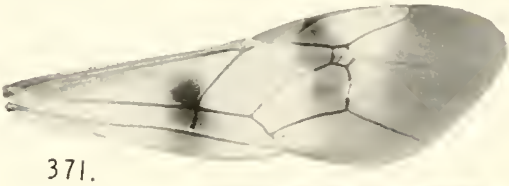
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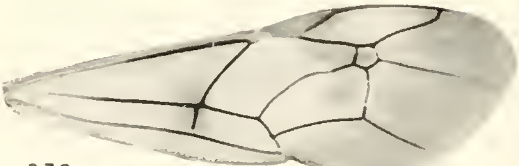
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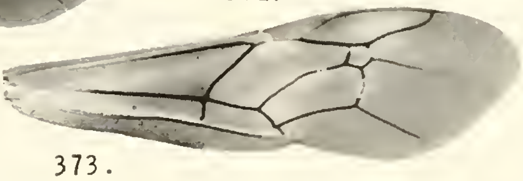
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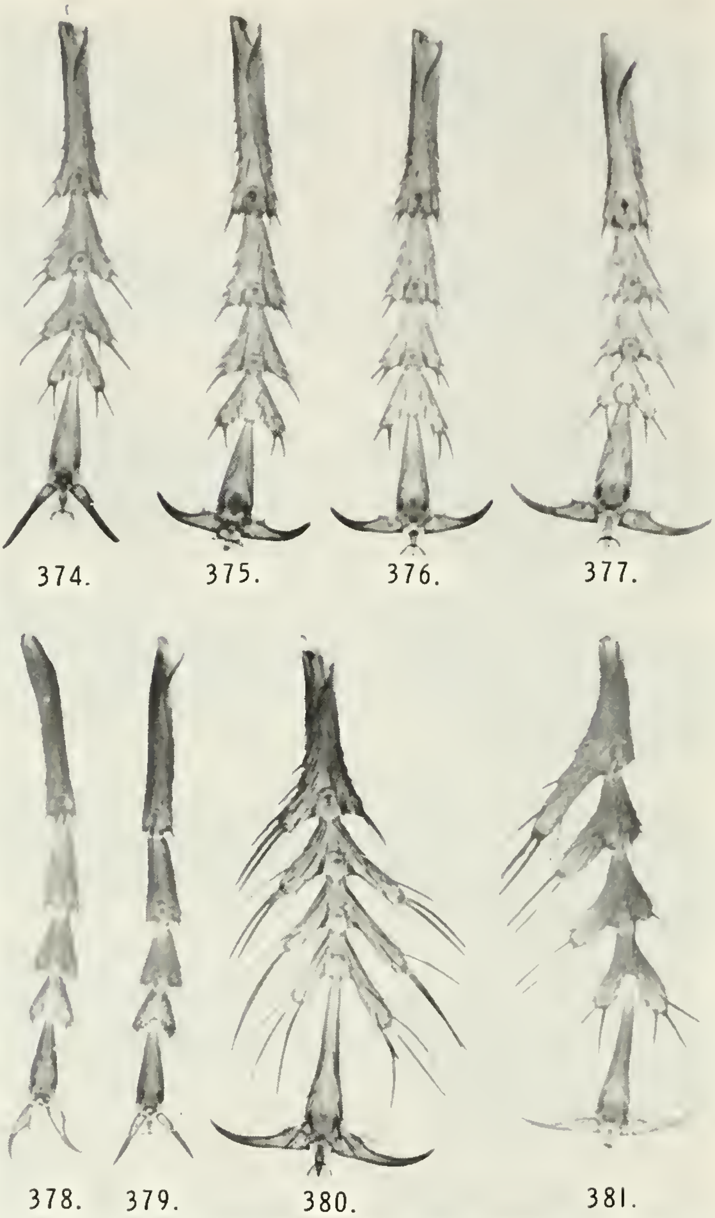
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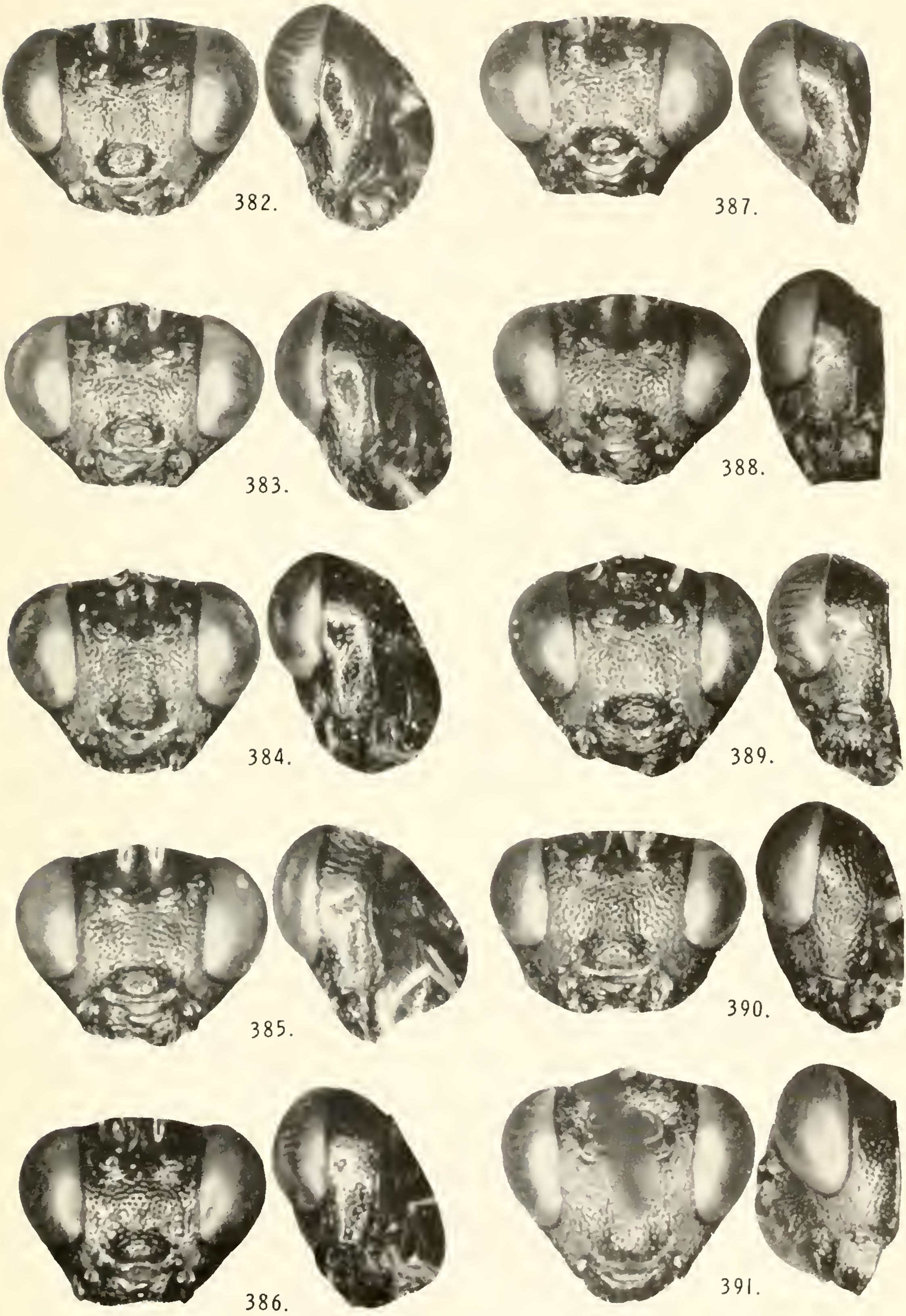
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386, *apicalis*
387, *sulcata*
388, *semirubra semirubra*
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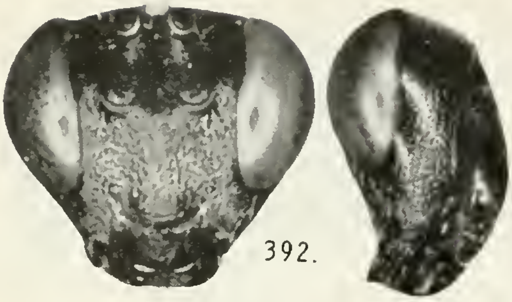
390, *fuscata*
391, *albitarsis albitarsis*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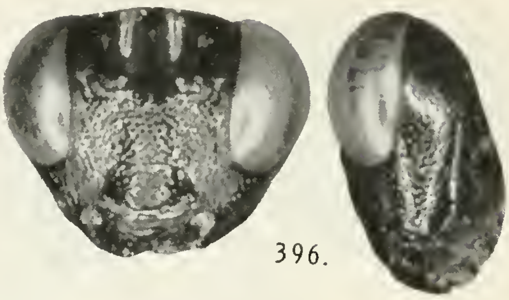
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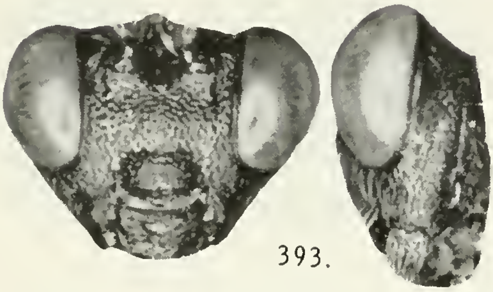
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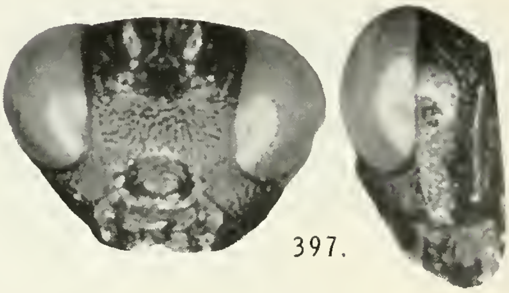
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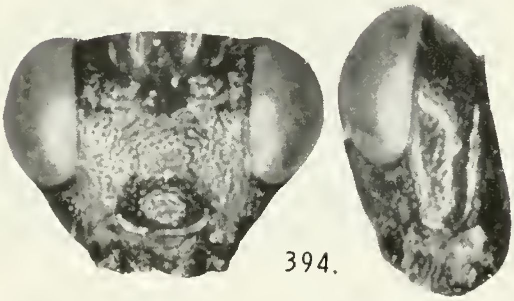
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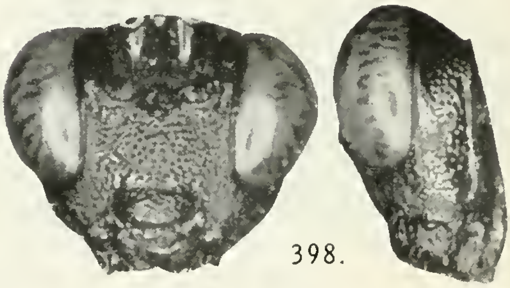
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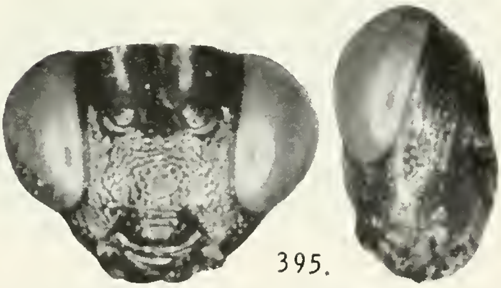
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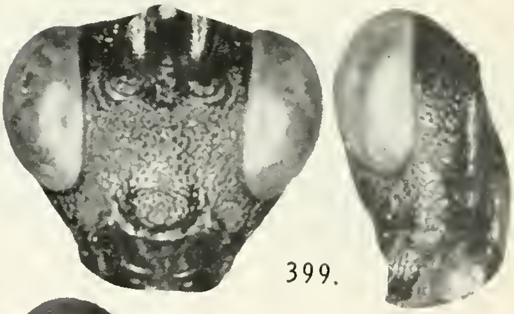
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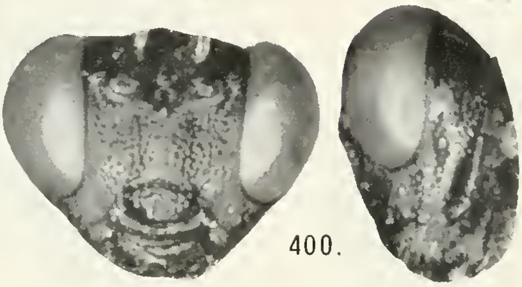
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